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1ST PART

PASSERES

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
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PASSERES

FAM. EURYLÆMIDÆ

by ERNST HARTERT

WITH 1 COLOURED PLATE

1905

PRICE 3/9 (FR. 4.75)



PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

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FAM. EURYLÆMIDÆ

BY ERNST HARTERT, PH. D.

Obenholzer 29 Sept 47 parts 1-5, 18-26
IN former times, when the ornithological system was chiefly founded on the external structure of the bill and feet, the *Eurylæmidæ* were mostly arranged among the « *Picariæ* » or « *Coraciiformes* », generally near *Coracias*, because the bill of the *Eurylæmidæ* has a great outward resemblance to that of a *Coracias*. As long ago as 1840, however, attention has been drawn to the fact that the pterylography was that of Passerine birds, Blanchard declared that the sternum was more Passerine, Garrod and Forbes have studied the palate, trachea and structure of the foot and pronounced their main features as Passerine, Kutter called attention to the nidology and oology, which are also Passerine. It is therefore now universally admitted that the *Eurylæmidæ* are Passerine birds, though abnormal and best placed at the top of that order, as a distinct group.

The sternum of the *Eurylæmidæ*, although the manubrium sterni is not forked, differs widely from that of *Coracias* and all its main features are truly Passerine; the palate is ægithognathous, the nasals holorhinal; the dorsal vertebræ are heterocoelous. The flexor longus hallucis leads to the hallux and sends down a tendon to the flexor perforans digitorum, which leads to the three front-digits. The hallux is thus incapable of independant action. The oil-gland is small and nude.

The bill is very wide, flat, but higher and distinctly ridged in the *Calyptomenina*, the nasals basal, round, open, either quite exposed or overgrown with bristly feathers, or lineiform. The metatarsus is sometimes covered in front with some large, very distinctly separated scutellæ, while in other forms the scutellæ are mostly fused, thus forming a long lamina, divided only on the lower end, near the toes. The back of the metatarsus is somewhat rugose, covered with

1. GENUS CORYDON LESSON

Corydon Lesson, Man. Orn. p. 177 (1828) (type of the genus *C. sumatranus*); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466 (1888).

Characters. The bill is enormously wide at base, measuring considerably more from one angle of the mouth to the other, than the length of the exposed culmen. The round nostrils are almost hidden by feathers, the cutting edges of the upper jaw are curved and overlapping. The scutes in front of the metatarsus are distinct, the back has a sharp edge. The tail is strongly graduated but only about two thirds the length of the wing. The feathers of the body are hard and somewhat stiff. The colouration is very peculiar among the *Eurylæmidæ*, as the plumage is dull black, the throat dull fulvous-white, narrow white bars on tail and wings and a very peculiar, quite concealed orange and white patch on the back. *Corydon* feeds on insects (large beetles, orthoptera, etc.) and hunts not only in daytime, but also in the twilight. The nidification is not yet known.

Geographical Distribution. Only one species, inhabiting Southern Tenasserim, the Malay Peninsula, Sumatra and Borneo.

1. *Corydon sumatranus* (Raffles) (Plate, Fig. 1.).

Coracias sumatranus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 303 (1822) (Sumatra).

Corydon sumatranus (Raffles) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 466.

Southern Tenasserim,
Malay Peninsula,
Sumatra, Borneo.

2. GENUS EURYLAIMUS HORSFIELD

Eurylaimus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (type of the genus *E. javanicus*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Synonym : *Platyrhynchos* Vieillot, Gal. Ois. Vol. 1, p. 199 (1825).

Characters. Bill very wide and flat, culmen strongly curved, the ridge not sharp and not strongly marked. The cutting edge of the upper bill bulges out near the base and overlaps the lower bill, but not nearly as much as in *Corydon*. The under mandible is nearly straight. Nostrils round, quite free, though immediately in front of the frontal feathering. *E. javanicus* has two elongated, narrow feathers on the sides of the upper back. The feathers of the head and neck, more especially in *E. javanicus*, are somewhat hard and stiff. The metatarsus is distinctly, though not much, longer than the middle toe. The scutes in front of the metatarsus are fused, only the lowest one being still well defined, the upmost portion of the metatarsus is covered with feathers. The tail is much rounded, the lateral rectrices being $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. shorter than the middle pair, the tail is about three quarters the length of the wing. The third and fourth primaries are about or nearly equal and longest, the first distinctly longer than the secondaries. The nest is a suspended bag, hanging on branches of trees, the eggs are spotted.

The two species are very unlike each other.

Geographical Distribution. They range from Southern Tenasserim over the Malay Peninsula to Sumatra, Java and Borneo.

1. — Much larger, head and throat vinous brown or vinaceous grey *E. JAVANICUS*.
2. — Much smaller, head and throat black *E. OCHROMELAS*.

1. **Eurylaimus javanicus** Horsfield

Eurylaimus javanicus Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 170 (1822) (Java)
Eurylaimus javanicus Horsfield, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 463 (1888).

Southern Tenasserim,
 Malay Peninsula,
 Siam, Cambodia,
 Sumatra, Borneo and Java.
 Tenasserim, Malay
 Peninsula, Sumatra,
 Borneo.

2. **Eurylaimus ochromelas** Raffles.

Eurylaimus ochromelas Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 297 (1822) (Sumatra).
Eurylaimus ochromelas Raffles, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 465 (1888).

3. GENUS SERILOPHUS SWAINSON

Serilophus Swainson, Classif. of Birds. Vol. 2, p. 262 (1837) (type of the genus *S. lunatus*), Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 460 (1888).

Characters. The members of the genus *Serilophus* are nearest allied to *Eurylaimus*, but their bills are smaller and the tails and wings are longer, moreover the plumage is wonderfully soft and silky to the touch. The scales in front of the metatarsus are almost quite fused. The middle secondaries are unusually broad. The females have a silvery white band across the lower throat, which is not found in the males. The nests are as usual, the eggs spotted.

Four forms of the genus are known. One of these, *Serilophus rubropygia*, has the longest primaries normal, with rounded tips, while *S. lunatus* and its two allies have them suddenly and sharply pointed. While *S. rubropygia* is of course a totally distinct species, the other three forms are better regarded as subspecies, i. e. geographical races. They may be distinguished as follows :

- | | | | |
|--|---|--|-------------------------|
| 1. | { | Primaries rounded at the tips | S. RUBROPYGIA. |
| Primaries pointed at the tips. | | S. LUNATUS (2). | |
| 2. | { | Sides of face rusty buff | S. LUNATUS LUNATUS. |
| | | Sides of face grey, inner secondaries entirely cinnamon | S. LUNATUS ROTHSCHILDI. |
| | | Sides of face brownish grey, inner webs of inner secondaries slaty-grey with pale cinnamon tips. | S. LUNATUS POLIONOTUS. |

Geographical Distribution. Two species, one of them in three subspecies, ranging from the Himalayas throughout the Indo-Burmese countries to the mountains of the Malay Peninsula and Hainan.

1. **Serilophus rubropygia** (Hodgson).

Raya rubropygia Hodgson, Journ. Asiat. Soc. Beng. Vol. 8, p. 36 (1839) (Nepal).
Serilophus rubropygius (Hodgson) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 461 (1888).

Himalayas below
 5000 feet, Assam to
 Arrakan and Manipur.

2. **Serilophus lunoatus lunatus** (Gould).

Eurylaimus lunatus Gould, Proc. Zool. Soc. Lond. p. 133 (1833).
Serilophus lunatus (Gould) cf. Sclater, Cat. Birds, Brit. Mus. Vol. 14, p. 460 (1888).

Tenasserim, Pegu,
 Karennee.

3. **Serilophus lunoatus rothschildi** Hartert & Butler (**Plate, Fig. 5.**).

Serilophus rothschildi Hartert & Butler, Bull. Brit. Orn. Cl. Vol. 7, p. 1 (1898).

Perak Mountains,
 Malay Peninsula.

4. **Serilophus lunatus polionotus** Rothschild.

Serilophus lunatus polionotus Rothschild, Bull. Brit. Orn. Cl. Vol. 14, p. 7 (1903).

Island of Hainan.

4. GENUS SARCOPHANOPS SHARPE

Sarcophanops Sharpe, Trans. Linn. Soc. Lond. (Zool.), (2), Vol. 1, p. 344 (1879), (type of the genus *S. steerii*). Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1838).

Characters. The two Philippine *Eurylæmidæ* or Broadbills (Hornrachen) have a peculiar wattle-like ring of naked skin round the eyes, as it is found in *Arses telescopthalmus*

and allies, a group of Papuan Flycatchers. Otherwise they do not differ essentially from the genus *Eurylaimus*. The sexes differ in the colour of the undersurface which is vinaceous-grey in the males, white in the females.

Geographical Distribution. Two forms, inhabiting some of the Philippine Islands, are known.

1. — *Upperside slate-grey* S. STEERII.
2. — *Upperside vinous brown* S. SAMARENSIS.

1. ***Sarcophanops steerii* Sharpe (Plate, Fig. 6.).**

Sarcophanops steerii Sharpe, Trans. Linn. Soc. Lond. Zool. (2), Vol. 1, p. 344, pl. 54 (1837).

Sarcophanops steerii Sharpe, cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 462 (1888).

Philippine Islands
(Dinagat, Mindanao,
Basilan).

2. ***Sarcophanops samarensis* Steere.**

Sarcophanops samarensis, Steere, List Birds & Mamm. Philipp. p. 23 (1890).

Philippine Islands
(Samar, Leyte).

5. GENUS PSARISOMUS SWAINSON

Psarisomus Swainson, Classif. of Birds, Vol. 2, p. 261 (1837) (type of the genus *P. dalhousiæ*);
cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 457 (1888).

Synonyms : *Crossodera* Gould, Icones Avium, pl. 1 (1837). — *Raya* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 8, p. 36 (1839). — *Sinius* Hodgson, op. cit., Vol. 10, p. 27 (1841). — *Simornis*, Hodgson, Gray's Zool. Misc. p. 82 (1844).

Characters. This gaily coloured group differs from all the rest of the *Eurylamidae* in its very strongly graduated, long tail with rather narrow rectrices, while the nostrils are rounded and basal, as usual, but in a rather large groove and partly hidden by small and stiff frontal plumes. The lateral pair of rectrices is only two fifths the length of the central ones. The colour is beautiful : green (much lighter underneath), yellow throat, black pileum with a blue central patch and greenish yellow patches of elongated and narrow feathers behind the eyes. The nest is rather long, inside lined with fresh leaves, and is remarkable for the large porch, which overhangs the entrance-hole. The eggs are spotted. These birds catch insects on the wing, like other *Eurylamidae*, especially Orthoptera. Three forms, undoubtedly subspecies of one species, can be distinguished.

Geographical Distribution. From the Himalaya mountains through Assam, Burma, the mountains of the Malayan Peninsula, Sumatra and Borneo.

1. — *Green on underside richer, darker, wing slightly longer, tips of feathers on sides of neck more yellow* P. DALHOUSIÆ DALHOUSIÆ.
2. — *Green on underside equally rich and dark as in 1, but wing slightly shorter, tips of feathers on sides of neck more white* . . . P. DALHOUSIÆ PSITTACINUS.
3. — *Green on underside paler, more white towards the bases of the feathers, wing as short as in 2, tips of feathers on sides of neck much more white than yellow* P. DALHOUSIÆ BORNEENSIS, subsp. nov.

1. ***Psarisomus dalhousiæ dalhousiæ* (Jameson) (Plate, Fig. 7.).**

Eurylaimus dalhousiæ Jameson, Edinb. New Phys. Journ. Vol. 18, p. 589 (1835).

Psarisomus dalhousiæ (Jameson), cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 458 (1888).

Himalaya Mountains,
Assam, Manipur,
Cachar, Burma (1).

(1) Burmese birds have been separated as *P. assimilis* by Gould. The differences he mentions may be found to exist if a good series could be compared.

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2. ***Psarisomus dalhousiæ psittacinus*** (Müller). Sumatra.
Eurylaimus psittacinus Müller, Tijdschr. Nat. Gesch. Vol. 2, p. 349, pl. 5 (1835).
Psarisomus dalhousiæ (Müller) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14 p. 458 (1888).
3. ***Psarisomus dalhousiæ borneensis*** Hartert, subsp. nov. Mountains of N. W.
Borneo.
(Type ♂ no. 2451, Kina Balu, Borneo 12. April 1888, collected by John Whitehead, in Mus. Rothschild). The blue on the primaries is also lighter in the Bornean form, the other differences are stated on p. 6.

6. GENUS CYMBIRHYNCHUS VIGORS

Cymbirhynchus Vigors, Mem. Raffles, p. 654 (1830); Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1898).

Characters. The genus *Cymbirhynchus* differs from all the other *Eurylæmidæ* in the form of the nostrils, which are longitudinal, and are situated in about the middle of the upper mandible. The bill is higher than in the other genera of *Eurylæminæ* (though not as high as in the *Calyptomeninæ*) and has a sharp ridge along the culmen. The colour of the bill is in life a most beautiful greenish sky-blue with yellow base and edges, the iris is of a most lovely golden moss-green. These marvellous colours, however, disappear entirely in the dried skins. At the base of the bill are two very conspicuous long and strong, and a few smaller bristles. The tail is very strongly graduated, the lateral rectrices being about half as long as the central pair, and the tail is nearly as long as the wing. The metatarsus in front is divided into only four scutes, the upper one of which reaches over half the length of the metatarsus, the back of which is a soft skin in life, shrivelled up in the skin.

The scapulars are most peculiarly shaped : the upper ones are greatly elongated, narrow, pointed, and of a white colour, thus forming a very conspicuous white line on each side of the black back. The rest of the plumage is red and black. The plumage covering the upperside, breast and abdomen is soft, that of the throat more compact and very hard, the earcoverts quite stiff and hard. Nests pendant bags, eggs spotted. The young bird has spotted wing-coverts.

Geographical Distribution. Borneo, Sumatra, Malay Peninsula, North to Arrakan and Pegu. One species composed of three subspecies.

1. — Tail usually without white C. MACRORHYNCHUS MACRORHYNCHUS.
2. — Tail with white bars on inner webs C. MACRORHYNCHUS LEMNISCATUS.
3. — Tail with white bars on both webs of outer rectrices C. MACRORHYNCHUS AFFINIS.

1. ***Cymbirhynchus macrorhynchus macrorhynchus*** (Gmelin). (Plate, Fig. 3). Borneo.
Todus macrorhynchus Gmelin, Syst. Nat. Vol. 1, p. 446 (1788) (No locality, figure shows the Bornean form).
Cymborhynchus macrorhynchus (Gmelin) cf. Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 468 (1888).
2. ***Cymbirhynchus macrorhynchus lemniscatus*** (Raffles). Sumatra,
Malay Peninsula to
Tenasserim,
Eurylæmus lemniscatus Raffles, Trans. Linn. Soc. Lond. Vol. 13, p. 175 (1821).
3. ***Cymbirhynchus macrorhynchus affinis*** Blyth. Arrakan and Pegu
(Burmah).
Cymbirhynchus affinis Blyth, Journ. Asiat. Soc. Beng. Vol. 15, p. 312 (18 ?)
Cymborhynchus affinis Blyth, cf Sclater, Cat. Birds Brit. Mus. Vol. 14, p. 47 a (1888).

EXPLANATION OF PLATE

- Fig. 1. *Corydon sumatranus* (Raffles).
— 2. *Eurylaimus javanicus* Horsfield.
— 3. *Cymbirhynchus macrorhynchus* (Gmelin).
— 4. *Calypomena viridis* Raffles.
— 5. *Serilophus lunatus rothschildi* Hartert & Butler.
— 6. *Sarcophanops steerii* Sharpe.
— 7. *Psarisomus dalhousiæ* (Jameson).

(All figures are of the natural size).

Tring (Herts), 30th. April 1903.



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1. CORYDON SUMATRANUS. 2. EURYLAIMUS JAVANICUS. 3. CYMBIRHYNCHUS MACRORHYNCHUS. 4. CALYPTOMENA VIRIDIS.
5. SERILOPHUS LUNATUS ROTHSCILDI. 6. SARCOPHANOPS STEERII. 7. PSARISOMUS DALHOUSIE.

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2^d PART

PICARIÆ

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FAM. TODIDÆ

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BY P. WYTSMAN

HE type of this small platyrostral family, *Todus viridis*, was known since Linnæus, who has described it for the first time in his *Systema Naturæ* Vol. 1, p. 178 (1766). At present all the authors have admitted the *Todidæ* to form a special family. Dr. R. Bowdler Sharpe in his *Catalogue of Birds in the British Museum* Vol. 17, p. 333 (1892) placed the family between the *Momotidæ* and the *Coliidæ*, in his *Hand-List of the Genera and Species of Birds*, Vol. 2, p. 78 (1900) between the *Momotidæ* and the *Caprimulgidæ* and Alphonse Dubois in his *Synopsis Avium* Vol. 1, p. 95 (1899-1902) between the *Momotidæ* and the *Meropidæ*. Other authors have placed it otherwise, but all the ornithologists are at present in accord to consider these beautiful species or subspecies of the genus *Todus* as forming a special and distinct family.

If we admit the oldest species known, the *Todus viridis* of Linnæus, as the type of the family and if we examine carefully the other forms described since, it is evident that the three species described under the names of *T. subulatus*, *T. multicolor* and *T. hypochondriacus* agree in their main features and that the characteristics which distinguish them from *T. viridis* are not very important ones, so that we may consider them as subspecies or local varieties of the type *T. viridis*, as they strictly represent the latter geographically.

Todus pulcherrimus described by R. Bowdler Sharpe (*The Ibis* p. 353, pl. 3, fig. 3 (1874); id. *Cat. Birds Brit. Mus.* Vol. 17, p. 336 (1892), does not seem to have sufficient characters to constitute a different species or variety and I quite agree with Dr. E. Hartert, of Tring, who informs me that he considers it merely an individual aberration of *T. viridis hypochondriacus*. If it actually came from Jamaica, it must have been brought there from St. Domingo.

KEY TO THE GENUS TODUS

1. — *Flanks with more or less pink.*
- a. *Chest washed with green, moustachial stripe greyish, lores green, abdomen pale yellow in the middle* T. VIRIDIS VIRIDIS.
 - b. *Chest with a brownish grey wash, moustachial stripe whitish, lores green, abdomen yellow in the middle* T. VIRIDIS SUBULATUS.
 - c. *Chest with a clear grey wash, moustachial stripe whitish, lores yellow, abdomen white in the middle* T. VIRIDIS MULTICOLOR.
2. — *Flanks without any pink colour* T. VIRIDIS HYPOCHONDRIACUS.

Characters. I have not had the opportunity to examine the anatomical characters of the species of this small family, and therefore reproduce what Sharpe says in Vol. 17 of the *Cat. of Birds in the British Museum* p. 333 (1892) : « The palate is desmognathous, the basipterygoid » processe is absent. The sternum with four notches on the posterior margin open and not » converted into foramina as in the *Momotis*. Caeca large. The ambiens muscle is absent and no » carotid arteries are present. The spinal feather-tract is well defined on the neck, and is not » forked on the back. The oil-gland with well-developed tufts. The foot is anisodactyle. »

The bill is long, in triangular shape, moderately long, straight and flat and acuminate. There are some black bristles near the nostrils before the eyes. The top of the head, the hind neck, the back are green in all the species or subspecies. The tail is moderately long, the tail feathers, numbering 10, are green above and grey below, and the upper tail coverts are green, the under tail coverts yellowish. The throat is carmine or reddish. The chest is pale yellowish, greenish or pinkish. The flanks are carmine or yellowish. The secondaries, the primary coverts, the greater, median and lesser wing coverts and bastard wings are green, with the underside blackish. The foot is anisodactyle, the tarsus is slender, the toes are long and of the same thickness as the tarsus. The eyes are very pale grey (Gosse) in *T. viridis*.

Actual nest none, a hole being tunnelled by the birds themselves, at the end of which the eggs are deposited. The eggs are four in number and are white.

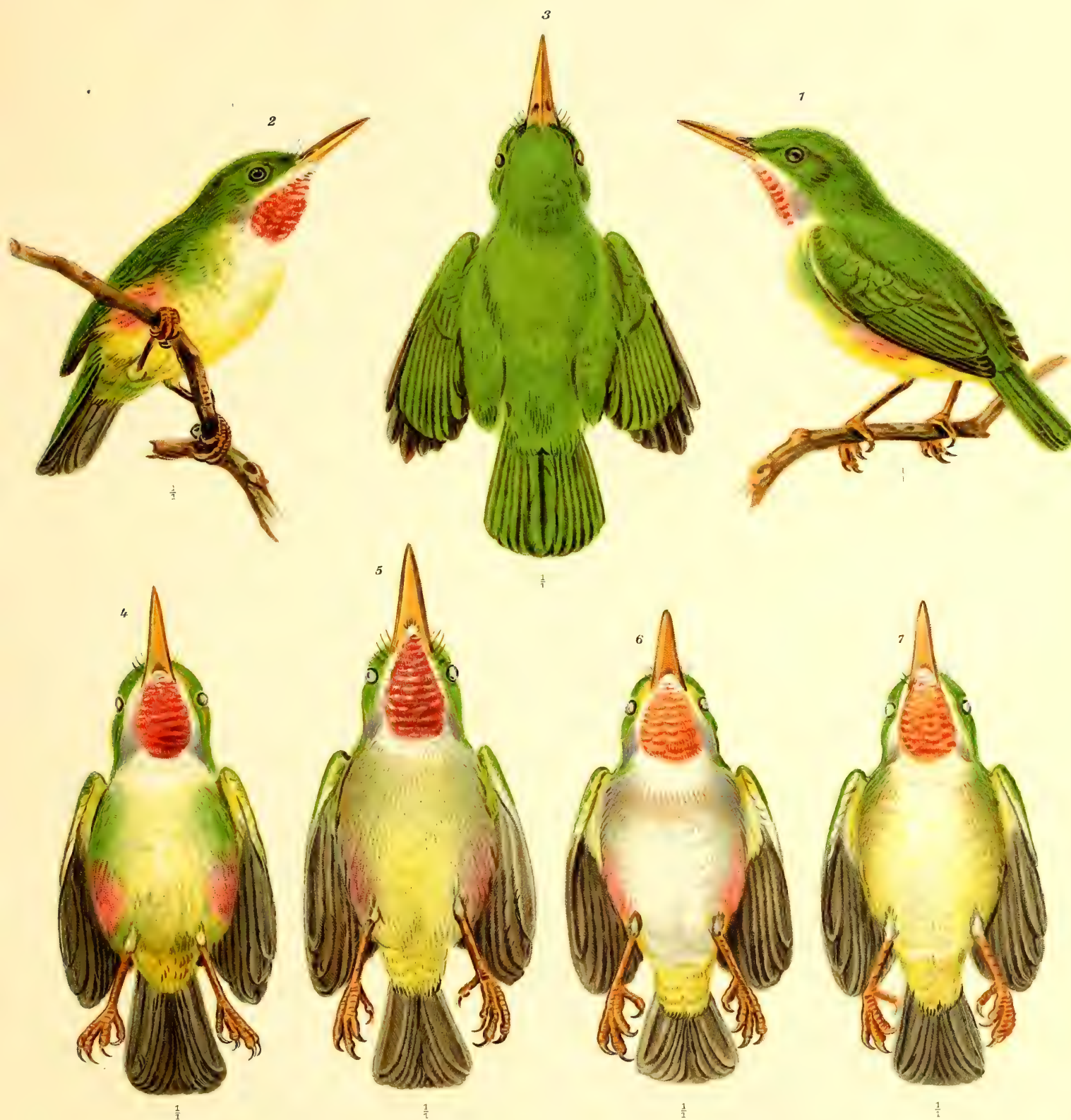
Bibliography. Murie, *The Ibis*, p. 644 (1872). — Sharpe, *The Ibis*, p. 339 (1874). — Cory, *Birds of West Indies*, p. 164 (1889). — Gosse, *Birds of Jamaica* (1857). — Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 333 (1892). — Dubois, *Synopsis Avium*, Vol. 1, p. 95 (1899).

Range. This family is entirely confined to the Greater Antilles (Jamaica, S. Domingo, Cuba, Porto Rico).

GENUS TODUS LINNÆUS

Todus Linnaeus, *Syst. Nat.* Vol. 1, p. 178 (1766) (Type of the genus *T. viridis*); Sharpe, *Cat. Birds Brit. Mus.* Vol. 17, p. 333 (1892).

Geographical Distribution. Peculiar to the Greater Antilles (Jamaica, S. Domingo and Haiti, Cuba, Porto Rico). One species in four distinct subspecies.



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1. 2. 3. 4. TODUS VIRIDIS VIRIDIS. 5. TODUS VIRIDIS SUBULATUS. 6. TODUS VIRIDIS MULTICOLOR.

7. TODUS VIRIDIS HYPOCHONDRIACUS.

1. **Todus viridis viridis** (Linnæus) (1) (Type of the family) (Plate, Fig. 1, 2, 3, 4). Jamaica.
Todus viridis Linnaeus, Syst. Nat. Vol. 1, p. 178 (1706).
Todus viridis Linnaeus, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 334 (1892).
 Total length 3.7 inches, culmen 0.75, wing 1.85, tail 1.5, tarsus 0.55.
2. **Todus viridis subulatus** (Gray) (Plate, Fig. 5). S. Domingo.
Todus subulatus Gray, Gen. Birds, Vol. 1, p. 63, pl. 22 (1847).
Todus subulatus Gray, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 339 (1892).
 Total length 4.4 inches, culmen 0.8, wing 1.95, tail 1.65, tarsus 0.55.
3. **Todus viridis multicolor** (Gould) (Plate, Fig. 6). Cuba.
Todus multicolor Gould, Icon. Avium, pl. 2 (1837).
Todus multicolor Gould, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 335 (1892).
 Total length 3.6 inches, culmen 0.75, wing 1.7, tail 1.3, tarsus 0.55.
4. **Todus viridis hypochondriacus** (Bryant) (Plate, Fig. 7). Porto Rico.
Todus hypochondriacus Bryant, Proc. Bost. Soc. Nat. Hist. Vol. 11, p. 39 (1866).
Todus hypochondriacus Bryant, cf. Sharpe, Cat. Birds Brit. Mus. Vol. 17, p. 336 (1892).
 Total length 3.7 inches, culmen 0.9, wing 1.85, tail 1.3, tarsus 0.55.

Habits. In all parts of Jamaica the Tody is a very common bird. On the summit of Bluefields Mountain, about 3,000 feet from the level of the sea, and particularly where the deserted provision-grounds are overgrown with a thicket, almost impenetrable, of jointer or joint-wood, this bird is especially abundant. Always conspicuous from its bright grass-green coat, and crimson-velvet gorget, it is still a very tame bird; yet this seems rather the tameness of indifference than of confidence; it will allow a person to approach very near, and, if disturbed, alight on another twig a few yards distant. We have often captured specimens with the butterfly net, and struck them down with a switch, and it is not uncommon for the little boys to creep up behind one, and actually to clap the hand over it as it sits, and thus secure it. It is a general favourite, and has received the favourite name of Robin Redbreast. I have never seen the Tody on the ground; but it hops about the twigs of low trees, searching for minute insects, occasionally uttering a querulous, sibilant note. But more commonly it is seen sitting patiently on a twig, with the head drawn in, the beak pointing upwards, the loose plumage puffed out, when it appears much larger than it is. It certainly has an air of stupidity when thus seen. But this abstraction is more apparent than real; if we watch it, we shall see that the odd looking grey eyes are glancing hither and thither, and that, ever and anon, the bird sallies out upon a short and feeble flight, snaps at something in the air, and returns to his twig to swallow it.

I have never seen the Tody eating vegetable food; but I have occasionally found in its stomach, among minute coleopterous and hymenopterous insects, a few small seeds. One, which I kept in a cage, would snatch worms from me with impudent audacity; and then beat them violently against the perch or sides of the cage to divide, before he swallowed, them.

One, captured with a net in April, on being turned into a room, began immediately to catch flies, and other minute insects that flitted about. At this employment he continued incessantly, and most successfully, all that evening, and all the next day from earliest dawn to dusk. He would sit on the edge of the tables, on the lines, on shelves, or on the floor, ever

(1) The employment of trinomials, so much dreaded by some ornithologists, is nevertheless most advisable. Nothing is more clear, more easy to remember, and more practical.

Doubtless *Todus viridis subulatus* is shorter and simpler than *Todus viridis* var. *subulatus* or *Todus viridis* subsp. *subulatus*. The trinomial nomenclature will doubtless be generally employed in Ornithology when its usefulness and practicality will be evident.

glancing about, now and then flitting up into the air, when the snap of his beak announced a capture, and he returned to some station to eat it. He would peep into the lowest and darkest corners, even under the tables, for the little globose, long-legged spiders, which he would drag from their webs and swallow. He sought these also about the ceiling and walls, and found very many. I have said that he continued at this employment all day without intermission, and, though I took no account, I judged that, on an average, he made a capture per minute. Water in a basin was in the room, but I did not see him drink, though occasionally he perched on the brim; and when I inserted his beak into the water, he would not drink. Though so actively engaged in his own occupation, he cared nothing for the presence of man; he sometimes alighted voluntarily on our heads, shoulders, or fingers; and when sitting, would permit me at any time to put my hand over it, though, when in the hand, he would struggle to get out.

The inhabitants of Jamaica are not in the habit of domesticating many of the native birds; else this is one of the species which would become a favourite pet. (cf. Gosse, *Birds of Jamaica*, p. 72, London 1847).

EXPLANATION OF PLATE

- Fig. 1, 2, 3, 4. *Todus viridis viridis* (Linnæus).
— 5. *Todus viridis subulatus* (Gmelin).
— 6. *Todus viridis multicolor* (Gould).
— 7. *Todus viridis hypocondriacus* (Bryant).
(All figures are of the natural size).

Brussels, 1st June 1905.

q593.2
W99g
pt.3

3RD PART PSITTACI

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &^a

PSITTACI

FAM. STRINGOPIDÆ

by T. SALVADORI

WITH 1 COLOURED PLATE

1905

PRICE 2/9 (FR. 3.40)



PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

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FAM. STRINGOPIDÆ

FAM. STRINGOPIDÆ

BY T. SALVADORI



THE type of this family is a very extraordinary bird which combines the characters of the Parrots with the appearance of an owl. The distinguishing points of the family are as follows : The sternum is incomplete, with only a rudimentary keel. The orbital ring is complete. The bill is thick, swollen on the sides, with no notch; underside of the hook provided with a file-like surface; gonys rounded with five ridges and four grooves. The nostrils are open in a naked cere, much swollen. The wing is short and rounded; fourth and fifth or even sixth primaries the longest; first nearly equal to the ninth. The tail is short, rounded, with the feathers acuminate. The tarsus is rather long, covered with rounded scales; nails moderately long and stretched. The feathers are rather soft, those surrounding the eyes disposed in a kind of circle, as in the owls.

Range. Only one genus confined to New Zealand.

GENUS STRINGOPS GRAY

Strigops Gray, Gen. Birds, Vol. 2, p. 426 (1845).

Characters. The same as those of the family.

Two species of this genus have been described, but probably one of them is based on an individual variety.

- | | |
|---|-----------------|
| a. <i>Upper surface sap-green; larger</i> | S. HABROPTILUS. |
| b. <i>Upper surface bluish; smaller</i> | S. GREYI. |

1. **Stringops habroptilus** Gray (**Plate, Fig. 1a, b, c, d, e**). New Zealand
Stringops habroptilus Gray, Gen. Birds Vol. 2. p. 427, pl. cv (1845).
Stringops habroptilus Finsch, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 599 (1891).
- 2 **Stringops greyi** Gray (doubtful) Patria ignota.
Stringops greyi Gray, Ibis, p. 230 (1862).
Stringops greyi Finsch, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 601 (1891).

We have also figured a yellow variety kindly lent us by Sir Walter Buller (**Plate, Fig. 2**).

EXPLANATION OF PLATE

Fig. 1a. *Stringops habroptilus* Gray.

- | | | | | |
|---|---|---|---|------------------------|
| — 1b. | — | — | — | Feather of the breast. |
| — 1c. | — | — | — | Feather of the flanks. |
| — 1d. | — | — | — | Feather of the back. |
| — 1e. | — | — | — | Foot. |
| — 2. <i>Stringops habroptilus</i> Gray. Yellow variety. | | | | |

Turin, 15th March 1905.



FAM. STRINGOPIDÆ

1. 1a. STRINGOPS HABROPTILUS. 1b. IB. FEATHER OF THE BREAST. 1c. IB. FEATHER OF THE FLANKS.
1d. IB. DORSAL FEATHER, 1e. IB. FOOT. 2. VAR. LUTEA.

q598.2
W99g
pt.4

4TH PART

PSITTACI

GENERA AVIUM

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PSITTACI FAM. NESTORIDÆ

by T. SALVADORI

WITH 2 COLOURED PLATES

1905

PRICE 2/11 (FR. 3.60)



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FAM. NESTORIDÆ

FAM. NESTORIDÆ

BY T. SALVADORI



THE *Nestoridæ* form a very distinct family among the Psittaci.

Characters. The bill is rather long, longer than deep, much compressed with the culmen grooved along the middle; the hook of the bill underneath nearly smooth, but with superficial longitudinal ridges; under mandible with the gonys nearly straight, or slanting in a gentle curve towards the tip (*cf. Cat. Birds Brit. Mus. Vol. 20, p. 3 (1891) fig. 1, bill and under surface of the hook*). The cere partly covered with hairy feathers. The tongue with a delicate fringe of hairs at the tip. The tail-feathers 12, with the shafts pointed and projecting beyond the webs. The feathers soft, those at the base of the lower mandible projecting forward and hairy. The tarsus is rather long, like that of *Stringops*. The orbital ring is complete. The colouring of the feathers is generally brown, relieved with red and yellow.

Habits. The *Nestoridæ*, like all the Parrots do, have their nests in hollow trees, or in the crevices of the rocks, and lay from two to four white eggs. They live in woods, or among shrubby rocks on high mountains, feeding on insects and their larvæ, and also on a variety of juicy berries; they are very fond of sucking nectar from the crimson flowers of the Rata (*Metrosideros robusta*). It is a well known fact that one species of Nestor (*N. notabilis*) in its wild state has a great penchant for raw flesh, attacking the sheep to obtain it. The species of this genus are easily tamed.

Range. The *Nestoridæ* are confined to the New Zealand subregion.

Bibliography : Garrod, Proc. Zool. Soc. Lond. (1872), p. 787-789 (tongue).— Buller, Birds New Zeal. p. 39-57 (1873); id. op. cit. 2d. ed. p. 150-175. pls. 17, 18 (1888).— Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4-10 (1891). — Lorenz, Verh. Zool. Bot. Ges. Wien, p. 197-199 (1896).— Dubois, Syn. Av. Vol. 1, p. 27 (1899). — Sharpe, Handl. Birds, Vol. 2, p. 1 (1899).

The *Nestoridæ* consist of a single genus.

GENUS NESTOR WAGLER

Nestor Wagler, Mon. Psitt. p. 505 (1832) (ex-Lesson, Tr. d'Orn. p. 190 (1831)) (type of the genus *Psittacus meridionalis* Gmelin); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4-10 (1891).

KEY OF THE SPECIES

No yellow band across the breast :

Underparts olive-brown, with no red tinge whatever; bill very long, but not much curved N. NOTABILIS.

Abdomen and under tail-coverts tinged with red.

Larger; wing 29 to 31 cm.; crown paler ashy N. MERIDIONALIS.

Smaller; wing 26 to 28 cm.; crown darker ashy. N. SEPTENTRIONALIS.

A broad yellowish-white band across the breast :

Bill not more than two inches long (= 5 cm.).

Larger; fore-neck and upper breast hoary; wing 11.8 inches (= 50 cm.). N. ESSLINGI.

Smaller; fore-neck and upper breast light brown, with the feathers tinged with yellow; wing 10.3 inches (= 43 cm.). N. PRODUCTUS.

Bill extremely long, 3.8 inches (= 93 mm.) and curved in a semicircle N. NORFOLCENSIS.

Geographical Distribution. The six species known are confined to the New Zealand Subregion.

1. *Nestor notabilis* Gould (Plate, Fig. 2, 2a).

Nestor notabilis Gould, Proc. Zool. Soc. Lond. p. 94 (1856); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 4 (1891). South Island (New Zealand)

2. *Nestor meridionalis* (Gmelin) (Plate, Fig. 4, 4a, 4b).

Psittacus meridionalis Gmelin, Syst. Nat. Vol. 1, p. 333, n° 98 (1788). South Island (New Zealand)
Nestor meridionalis Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 5 (1891).

3. *Nestor septentrionalis* Lorenz (Plate, Fig. 1, 1a).

Nestor septentrionalis Lorenz, Verh. zool. bot. Ges. Wien, p. 198 (1896). North Island (New Zealand)

4. *Nestor esslingi* Souancé (doubtful).

Nestor esslingi Souancé, Rev. et Mag. Zool. p. 223 (1856); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 8 (1891). Unknown

5. *Nestor productus* (Gould) (extinct) (Plate, Fig. 3).

Ptytolophus productus Gould, Proc. Zool. Soc. Lond. p. 19 (1836). Philip Island
Nestor productus Gould, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 9 (1891).

6. *Nestor norfolcensis* Pelzeln (doubtful).

Nestor norfolcensis Pelzeln, Sitzb. K. Akad. Wissensch. Wien. Bd. 41, p. 322-325, (1860); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 10 (1891); Forbes & Robinson, Bull. Liverp. Mus. Vol. 1, p. 5, pl. 1 (1892). Norfolk Island

I have never seen a specimen of *Nestor septentrionalis*. Dr. E. Hartert writes to me that in Tring Museum there are four specimens from North Island which are sufficiently distinct from

the South Island ones; still it appears that it is not always easy to perceive the difference if single specimens only are compared.

The value of *N. esslingi* as a species is also questioned.

Dr. H. O. Forbes and Mr. H. C. Robinson have thrown some doubts as to *N. norfolcensis* being different from *N. productus*, but the two birds inhabiting two Islands I should say that they must have been different.

Dr. E. Hartert has sent me word that he is convinced that the bill of the so-called *N. norfolcensis* is an overgrown cage-bird bill.

EXPLANATION OF PLATE

Fig. 1. *Nestor septentrionalis* Lorenz.

- 1^a. — — — Primaries.
 - 2. *Nestor notabilis* Gould.
 - 2^a. — — — Feather of the breast.
 - 3. *Nestor productus* (Gould).
 - 4. *Nestor meridionalis* (Gmelin).
 - 4^a. — — — Dorsal feather.
 - 4^b. — — — Foot.
-

Turin, 15th April 1905.



FAM. NESTORIDÆ

1. NESTOR SEPTENTRIONALIS. 1a. IB. PRIMARIES. 2. NESTOR NOTABILIS. 2a. IB. FEATHER OF THE BREAST.
3. NESTOR PRODUCTUS. 4. NESTOR MERIDIONALIS. 4a. IB. DORSAL FEATHER. 4b. IB. FOOT.

q598.2
99g
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5TH PART

PSITTACI

GENERA AVIUM

EDITED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. P. L. SCLATER, R. BOWDLER SHARPE,
W. R. OGILVIE-GRANT, E. HARTERT, C. E. HELLMAYR, T. SALVADORI, &^a

PSITTACI
FAM. CACATUIDÆ

by T. SALVADORI

WITH 2 COLOURED PLATES

1905

PRICE 6/0 (FR. 7.50)



PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

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FAM. CACATUIDÆ

FAM. CACATUIDÆ

BY T. SALVADORI



THE *Cacatuidæ* form a very distinct family among the *Psittaci* and may be easily distinguished.

Characters. Sternum complete. Orbital ring completely ossified, with a process bridging the temporal fossa. Nostrils open in a cere not much swollen, generally naked, but sometimes feathered. Bill very deep, deeper than long, with the upper mandible generally much compressed; hook of the upper mandible nearly perpendicular, except in *Licmetis*, and with a file-like surface underneath. Tarsus short. Head always crested.

As a rule, only the left carotid present.

Habits. The habits of the Kakatoes are very similar to those of the other Parrots.

Range. The *Cacatuidæ* range over the Australian Region, and also in the Philippines.

Bibliography. Selater, Proc. Zool. Soc. Lond. p. 182-189 (1862); Finsch, Die Papageien, Vol. 1, p. 256-378; Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 101-136; Rothschild & Hartert, Novit. Zool. Vol. 8, p. 531 (1901).

Two subfamilies can be easily distinguished :

SUBFAM. A. CACATUINÆ

Tail-feathers broad, not pointed.

This subfamily contains 5 genera.

SUBFAM. B. CALOPSITTACINÆ

Tail-feathers narrow, and pointed.

This subfamily consist of a single genus.

KEY OF THE GENERA OF THE CACATUINÆ

- A. Checks entirely naked; upper mandible much compressed and much narrower than the under mandible; feathers of the crest very long and narrow Genus MICROGLOSSUS.
- B. Checks feathered.
- a. Tail rather long, the outer tail-feathers shorter than the others; feathers of the crest broad; bill short, much curved and very high; general colour brown or black Genus CALYPTORHYNCHUS.
- b. Tail moderate, nearly even.
- a'. General colour above and below grey; head and crest red in the male; cere feathered Genus CALIOCEPHALUM.
- b'. General colour white or rosy white, except in *Cacatua roseicapilla*, which is grey above, rose colour on the head and below.
- a''. Bill with the hook of the upper mandible of the ordinary size and nearly perpendicular Genus CACATUA.
- b''. Bill with the hook of the upper mandible very long, slender and projecting forward Genus LICMETS.

Besides the above mentioned genera, to the *Cacatuidæ* has been assigned by Prof. A. Milne-Edwards also the genus *Lophopsittacus* containing a single extinct species, but according to Prof. A. Newton, it seems that its place in the system is far from being satisfactorily established; geographical distribution is not in favour of *Lophopsittacus* belonging to the *Cacatuidæ*.

GENUS LOPHOPSITTACUS NEWTON

Lophopsittacus Newton, Proc. Zool. Soc. Lond. p. 350 (1875) (type of the genus *Psittacus mauritianus* Owen).

Lophopsittacus mauritianus (Owen) (extinct).

Mauritius.

Psittacus mauritianus, Owen, The Ibis, p. 168 (1866).

Psittacus (*Lophopsittacus*) *mauritianus*, Newton, Proc. Zool. Soc. Lond. p. 349, 350 (1875).

Lophopsittacus mauritianus, Newton, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 102 (1901).

1. GENUS MICROGLOSSUS GEOFFROY ST-HILAIRE

Microglossus Geoffroy St-Hilaire, Ms.; Vieillot, Gal. des Ois. Vol. 1, p. 47, pl. 50 (1821-1823) (type of the genus *Psittacus aterrimus* Gmelin); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 102 (1891).

Synonyms: *Solenoglossus*, Ranz. Elem. Zool. Vol. 3, pt. 2, p. 18 (1821); *Microglossum* Vigors, Zool. Journ. Vol. 2, p. 63 (1825); *Microglossa* Voigt, Cuv. Uebers. p. 47 (1831); *Eurhynchus* « Latreille » Lesson, Tr. d'Orn. p. 183 (1831); *MacroGLOSSUM* Temminck, Coup d'œil sur les Poss. Néerl. Vol. 3, p. 405 (1849).

Geographical Distribution. The two species known are confined to the Papuan sub-region.

KEY OF THE SPECIES

- a. Larger; wing about 15 inches or 350 to 400 mm (*vide R. & H.*). *M. ATERRIMUS*.
 b. Smaller; wing about 12.8 inches or 310 to 350 mm. (*vide R. & H.*) *M. ALECTO*.

1. *Microglossus aterrimus* (Gmelin) (Plate I, Fig. 4).

New Guinea.

Psittacus aterrimus Gmelin, Syst. Nat. Vol. 1, p. 330, no 93 (1788).

N. Australia.

Microglossus aterrimus Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 103 (1891);

Büttikoffler, Not. Leyd. Mus. Vol. 16, p. 166, 167 (19th. Nov. 1894) (juv.).

Microglossus salvadorii Meyer, Bull. Brit. Orn. Cl. Vol. 4, n. 21, p. 6 (21th. Nov. 1894) (juv.); cf. Sharpe, Hand-List Birds, Vol. 2, p. 9 (1900).2. *Microglossus alecto* (Lesson).

Aru Islands and

Eurhynchus alecto Lesson, Compl. de Buffon, Vol. 9, p. 200 (1837).

W. Papuan Islands.

Microglossus alecto Bonaparte, Consp. Av. Vol. 1, p. 7 (1850).*Microglossus aterrimus* part., Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 103 (1891).*Microglossus aterrimus alecto* Rothschild & Hartert, Novit. Zool. Vol. 8, p. 77 (1901).

It appears to me that the *Microglossi* from the Aru Islands and the Western Papuan Islands although smaller than those from the main land can scarcely be considered as forming a distinct species.

2. GENUS CALYPTORHYNCHUS VIGORS & HORSFIELD

Calyptorhynchus Vigors & Horsfield, Trans. Linn. Soc. Lond. Vol. 15, p. 264 (1826) (type of the genus *Psittacus banksii* Latham); Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 106 (1891).

Synonym : *Banksianus* Lesson, Tr. d'Orn. p. 179 (1831).

Characters. Cheeks feathered; tail rather long; the outer tail-feathers shorter than the others; feathers of the crest broad; bill short, much curved and very high; general colour brown or black.

KEY OF THE SPECIES

A. A light patch on the ear-coverts.

a. Patch on the ear-coverts and tail-band white *C. BAUDINI*.

b. Patch on the ear-coverts and tail-band yellow.

a'. Larger, wing from 18 to 16 inches (= 457-405 mm) *C. FUNERUS*

b'. Smaller, wing from 15 to 14 inches (= 382-355 mm) *C. XANTHOSOTUS*.

B. No light patch on the ear-coverts; tail-band red in the adult males, red, more or less tinged with yellow and crossed by black narrow bands in the immature birds, and perhaps also in the adult females.

c. Head and neck like the body glossy greenish black.

c'. Larger; total length about 24 inches (= 610 mm); crest longer.

c''. Bill smaller and less powerful *C. BANJESH*.

b''. Bill larger, much more powerful *C. MACRORHYNCHUS*.

d'. Smaller; total length about 22 inches (= 560 mm.); crest shorter *C. STELLATUS*.

d. Head and neck brown; upper parts glossy greenish black *C. VIRIDIS*.

Geographical Distribution. The members of this genus are confined to Australia and Tasmania.

1. *Calyptorhynchus baudini* Vigors.

S. W. Australia.

Calyptorhynchus baudini Vigors, in Lear's Paroquets, pl. 6 (1832); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 106 (1891).

2. **Calyptorhynchus funereus** (Shaw).
Psittacus funereus Shaw, Nat. Misc. pl. 186 (1789).
Calyptorhynchus funereus Vigors & Horsfield, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 107 (1891).
S. E. Australia.
Tasmania.
3. **Calyptorhynchus xanthonotus** Gould.
Calyptorhynchus xanthonotus Gould, Proc. Zool. Soc. Lond. p. 151 (1837); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 108 (1891).
Tasmania.
S. Australia.
4. **Calyptorhynchus banksii** (Latham) (Plate 1, Fig. 3).
Psittacus banksii Latham, Ind. Orn. Vol. 1, p. 107, n. 76 (jong) (1790).
Calyptorhynchus banksii Vieillot & Horsfield, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 109 (1891).
E. Australia.
New S. Wales.
Victoria.
5. **Calyptorhynchus macrorhynchus** Gould.
Calyptorhynchus macrorhynchus Gould, Proc. Zool. Soc. Lond. p. 138 (1842); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 111 (1891).
N. Australia.
6. **Calyptorhynchus stellatus** Wagler.
Calyptorhynchus stellatus Wagler, Mon. Psitt. p. 685, t. 27 (av. jun.) (1832); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 111 (1891).
W. Australia.
7. **Calyptorhynchus viridis** (Vieillot).
Cacatua viridis Vieillot, Nouv. Dict. Vol. 17, p. 12 (1817).
Calyptorhynchus viridis, Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 112 (1891).
E. Australia.

3. GENUS CALLOCEPHALUM LESSON

Callocephalon Lesson, in Bougainville, Voy. Thétis, p. 311 (1837) (type of the genus *Psittacus galeatus* Latham).

Synonym : *Corydon* Wagler (nec Lesson), Mon. Psitt. p. 504 (1832).

Characters. Cheeks feathered; tail moderate, nearly even; cere feathered; general colour above and below grey; head and crest red in the male.

Geographical Distribution. Only one species confined to Australia.

1. **Callocephalum galeatum** (Latham) (Plate 1, Fig. 5).
Psittacus galeatus Latham, Suppl. Ind. Orn. p. 23, n. 13 (1802).
Callocephalon galeatum Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 113 (1891).
S. E. Australia.
Tasmania

4. GENUS CACATUA VIEILLOT

Cacatua Vieillot, Nouv. Dict. Vol. 17, p. 6 (1817) (type *Psittacus albus* P. S. L. Müller).

Synonyms : *Ptyctolophus*, Vieillot, Anal. p. 26, 70 (1816). — *Eolophus* Bonaparte, Rev. & Mag. Zool. p. 155 (1854). — *Ducorpsius* Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 44, p. 537 (1857). — *Lophochroa* Bonaparte, op. cit. — *Camptolophus* Sundevall, Meth. Nat. Av. disp. Tent. p. 69 (1872).

Characters. Cheeks feathered; tail moderate, nearly even; bill with the hook of the upper mandible of the ordinary size and nearly perpendicular; general colour white or rosy white, except in *Cacatua roseicapilla*, which is grey above, rose colour on the head and below.

Geographical Distribution. The fourteen species known inhabit Australia, the Austro-Malay subregion and the Philippines.

KEY OF THE SPECIES

- A. *Feathers of the crest narrow, with the slender point recurved at the extremity.*
 - a. *Crest yellow; cere naked.*
 - a'. *Crest sulphur-yellow.*
 - a''. *Feathers of the body white.*
 - a'''. *Larger, wing from 15-13 inches (= 388-330 mm.).*

- a⁴. Naked skin round the eyes white; feathers of the crest more pointed and more recurved C. GALERITA.
- b⁴. Naked skin round the eyes blue; feathers of the crest less pointed and less recurved C. TRITON.
- b'''. Smaller; wing about 9 inches (= 228 mm.) C. PARVULA.
- b'. Feathers of the body white, slightly but constantly tinged with sulphur-yellow; yellow patch on the ear-coverts very conspicuous. C. SULPHUREA.
- b'. Crest orange-yellow C. CITRINOCRISTATA.
- b. Crest vermilion at the base, with a yellow band in the middle of the vermilion part, white at the tip; cere feathered C. LEADBEATERI.
- B. Feathers of the crest broadened, and not recurved at the extremity.
- c. Larger, total length from 20-18 inches (= 508-456 mm.); feathers of the crest very long; cere naked.
- c'. Crest white. C. ALBA.
- d'. Crest sulphur-yellow C. OPHTHALMICA.
- e'. Crest vermilion. C. MOLUCCENSIS.
- d. Smaller; total length from 16-12.6 inches (= 408-315 mm.); feathers of the crest moderate; cere feathered.
- f'. Under surface white.
- f''. Under tail-coverts white.
- f'''. Lores stained with red.
- f⁴. Naked skin round the eyes largely extended into a bare blue open space below C. GYMNOPI.
- g⁴. Naked skin round the eyes nearly circular.
- g⁵. Larger; wing 10 inches (= 254 mm.) C. SANGUINEA.
- h⁵. Smaller; wing 9 inches (= 228 mm.) C. GOFFINI.
- g'''. Lores white C. DUCORPSI.
- g''. Under tail-coverts pale vermilion, edged with white C. HAEMATUROPYOGIA.
- g'. Under surface rose-colour; upper surface grey C. ROSEICAPILLA.

1. *Cacatua galerita* (Latham).

Australia, Tasmania.

Psittacus galeritus Latham, Ind. Orn. Vol. 1, p. 109, n. 80 (1790).*Cacatua galerita* Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 116 (1891).2. *Cacatua triton* (Temminck) (Plate 2, Fig. 2).

New Guinea and

Psittacus triton Temminck, Coup d'œil gén. sur les Poss. Néerl. Vol. 3, p. 405 (note) (1849).

Papuan Islands.

Cacatua triton Sclater, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 118 (1891).

The birds from the Western Papuan Islands (Waigiu, Salawatti, Mysol and Aru Islands) have been attributed to a smaller race or subspecies (*C. macrolopha* (Rosenb.), Nat. Tijdschr. Ned. Ind. Vol. 23, p. 45 (1861), while those from the Eastern Papuan Islands (Sud-est, Rossel, St. Aignan, Fergusson, Trobriand and Woodlark Islands) have also been separated as a distinct race (*C. trobriandi* Finsch, Samoafahrten, p. 208 (1888), somewhat larger than the latter.

3. *Cacatua parvula* (Bonaparte).

Lesser Sunda

Ptyctolophus parvulus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 30, p. 139 (1850).

Island.

Cacatua parvula Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 120 (1891).

Specimens from Lombok, Flores and Sumbawa have been separated as a distinct race (*Cacatua parvula occidentalis* Hartert, Novit. Zool. Vol. 5, p. 120, 1898) on account of the bill being larger and stronger.

4. *Cacatua sulphurea* (Gmelin).Celebes and Islands
in Celebean Sea.*Psittacus sulphureus* Gmelin, Syst. Nat. Vol. 1, p. 330, n. 94 (1788).*Cacatua sulphurea* Vieillot, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 121 (1891).

Specimens inhabiting Djampea Island in Celebean Sea have been separated (*Cacatua sulphurea djampeana* Hartert, Novit. Zool. Vol. 4, p. 164, 1897) having the bill somewhat smaller than the birds from Celebes.

5. ***Cacatua citrinocristata*** (Fraser). Sumba Island.
Ptyctolophus citrinocristatus Fraser, Proc. Zool. Soc. Lond. p. 38 (1844).
Cacatua citrinocristata Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 122 (1891).
6. ***Cacatua leadbeateri*** (Vigors). S. Australia and S. W. Australia.
Ptyctolophus leadbeateri Vigors, Proc. Zool. Soc. Lond. p. 61 (1831).
Cacatua leadbeateri Wagler, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 123 (1891).
7. ***Cacatua alba*** (Müller). Halmahera Group. (N. Moluccas).
Psittacus albus Müller, Syst. Nat. Suppl. p. 76, n. 50 (1776).
Cacatua alba Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 124 (1891).
8. ***Cacatua ophthalmica*** Sclater. New Britain.
Cacatua ophthalmica Sclater, Proc. Zool. Soc. Lond. p. 188, 189 (1864); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 125 (1891).
9. ***Cacatua moluccensis*** (Gmelin). Ceram. Amboina.
Psittacus moluccensis Gmelin, Syst. Nat. Vol. 1, p. 331, n. 96 (1788).
Cacatua moluccensis Wagler, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 126 (1891).
10. ***Cacatua gymnopsis*** Sclater. South Australia.
Cacatua gymnopsis Sclater, Proc. Zool. Soc. Lond. p. 490, 493 (cum. fig. capitis) (1871);
cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 127 (1891).
11. ***Cacatua goffini*** (Finsch) (Plate 1, Fig. 1, 1a). Tenimber Island Little Key.
Lophochroa goffini Finsch, Ned. Tijdschr. Dierk. Vol. 1, Berigt. p. 23 (1863).
Cacatua goffini Schlegel, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 129 (1891);
Hartert, Novit. Zool. Vol. 8, p. 5 (1901).
12. ***Cacatua ducorpsi*** Jacquinet & Pucheran (Plate 1, Fig. 2). Solomon Islands.
Cacatua ducorpsi Jacquinet & Pucheran, Voy. Pôle Sud, Zool. Vol. 1, p. 108, sp. 23 (1853);
cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 129 (1891).
13. ***Cacatua hæmaturophygia*** (Müller). Philippines and Sulu Islands.
Psittacus hæmaturophygius Müller, Syst. Nat. Suppl. p. 77, n. 51 (1776).
Cacatua hæmaturophygia Gray, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 130 (1891).
14. ***Cacatua roseicapilla*** Vieillot (Plate 2, Fig. 3). Australia.
Cacatua roseicapilla Vieillot, Nouv. Dict. Vol. 17, p. 12 (1817); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 132 (1891).

5. GENUS LICMETIS WAGLER

Licmetis Wagler, Mon. Psitt. p. 505 (1832) (type of the genus *Psittacus nasicus* Temminck).

Characters. The characters of this genus are very similar to those of the genus *Cacatua*, differing only in the hook of the upper mandible which is very long, slender and projecting forward.

Geographical Distribution. Only two species are known both confined to Australia.

KEY OF THE SPECIES

- a. *Smaller; naked skin round the eyes narrower, light blue* **L. NASICA.**
b. *Larger; naked skin round the eyes broader and darker, of a blue lead-colour* **L. PASTINATOR.**
1. ***Licmetis nasica*** (Temminck) (Plate 2, Fig. 4). E. N. and S. Australia.
Psittacus nasicus Temminck, Trans. Linn. Soc. Lond. Vol. 13, p. 115 (1819).
Licmetis nasica Ramsay, cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 133 (1891).
2. ***Licmetis pastinator*** Gould. W. Australia.
Licmetis pastinator Gould, Proc. Zool. Soc. Lond. p. 175 (1840); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 134 (1891).

SUBFAM. B. CALOPSITTACINÆ

This subfamily contains a single genus with one species only.

6. GENUS CALOPSITTACUS LESSON

Calopsitta Lesson, Ill. Zool. pl. 49 (1832) (type of the genus *Psittacus novæ hollandiæ* Gmelin).

Synonyms : *Leptolophus* Swainson, Zool. Ill. pl. 112 (1832); *Calopsittacus* Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 2, p. 199 (1878);

Characters. The tail-feathers narrow and pointed easily define this genus from the other genera of the *Cacatuidæ*. Besides the bill is moderate, with the upper mandible compressed on the sides towards the culmen; the gonys is broad and angular; the cere is naked; the wings are very long; the tarsi are short and the toes long and slender.

Geographical Distribution. The only species of this genus occurs in Australia.

1. **Calopsittacus novæ hollandiæ** (Gmelin) (Plate 2, Fig. 1, 1a, 1b).

Australia

Psittacus novæ hollandiæ Gmelin, Syst. Nat. Vol. 1, p. 328, n. 84 (1788).

Calopsittacus novæ hollandiæ Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. 2, p. 193 (1878); cf. Salvadori, Cat. Birds Brit. Mus. Vol. 20, p. 136 (1891).

EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Cacatua goffini* (Finsch).

- 1^a. — — Foot.
- 2. *Cacatua ducorpsi* Jacquinet & Pucheran.
- 3. *Calyptorhynchus banksii* (Latham).
- 4. *Microglossus aterrimus* (Gmelin).
- 5. *Callocephalum galeatum* (Latham).

PLATE 2

Fig. 1. *Calopsittacus novæ-hollandiæ* (Gmelin).

- 1^a — — — Wing.
- 1^b — — — Foot.
- 2. *Cacatua triton* (Temminck).
- 3. *Cacatua roseicapilla* Vieillot.
- 4. *Licmetis nasica* (Temminck).

Turin, 15th June 1905.



FAM. CACATUIDÆ

1. CACATUA GOFFINI. 1a. IB. FOOT. 2. CACATUA DUCORPSI. 3. CALYPTORHYNCHUS BANKSI. 4. MICROGLOSSUS ATERRIMUS.
5. CALLOCEPHALUM GALEATUM.



FAM. CACATUIDÆ

1. CALOPSITTACUS NOVÆ HOLLANDIÆ. 1a. IB. WING. 1b. IB. FOOT. 2. CACATUA TRITON. 3. CACATUA ROSEICAPILLA.
4. LICMETIS NASICA.

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by C. E. HELLMAYR

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FAM. PARIDÆ

FAM. PARIDÆ

BY C. E. HELLMAYR



THE Tits are small, ten-primaried, acutiplantar Oscines, with the bill much shorter than the head, more or less convex (except in subfamily *Remizinae*), and the wing rounded, with third to sixth primaries longest.

Characters. Bill relatively small, much shorter than the head, more or less conoidal, but extremely variable as to relative length, thickness and degree of curvature; the maxillary tomium usually smooth, very rarely with a slight subterminal notch (*Parisoma*), in one subfamily (*Paradoxornithinae*) more or less deeply sinuated; gonys relatively long (twice as long as mandibular ramus). Nostrils mostly very small, roundish, non-operculate, entirely concealed by antrorse latero-frontal plumules, sometimes, however, operculate, longitudinal and more or less exposed. Rictal bristles usually distinct, though never very conspicuous, sometimes (*Remizinae*, *Psaltiriparinae*) even obsolete. Wing rather long, rounded; third to sixth primaries longest; second primary exceedingly variable in length, either about equal to seventh or eighth, or (in subfamilies *Certhiparinae* and *Paradoxornithinae*) not longer than secondaries; first primary about half as long as second, sometimes (*Remizinae*, *Panurinae*) rudimentary, scarcely obvious. Tail variable in length, seldom only half as long as wing (in genus *Cephalopyrus*), usually about as long, sometimes much longer than wing, rounded, graduated or emarginate. Tarsus variable in length, but always decidedly longer than middle toe with claw; acrotarsium scutellate or booted; proportion of toes variable, usually outer toe slightly longer than inner toe, but slightly shorter than middle toe (except in *Mohoua*, in which genus outer and middle toes are equal), hallux equal in length to inner toe, but stouter, its claw much larger than those of anterior toes, sometimes nearly as long as the digit; basal phalanx of middle toe adherent to lateral toes for most, if not the whole, of its extent. Plumage lax, soft and copious.

Coloration extremely variable. See characters of subfamilies. Sexes mostly alike, sometimes different.

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan, Australian, New Zealand and Ethiopian Regions.

Six subfamilies with twenty-four genera.

Habits and Reproduction. The Titmice are arboreal, very active, non-migratory birds. Their foods consists both of insects and various kinds of seeds, fruits etc. Nidification variable: nest either placed in holes of trees, crevices of walls etc.; or a very bulky purse-like or retort-shaped structure, suspended or attached to branches of twigs of trees or bushes (*Remizinae*, *Psaltriparinae*); or an open, cup-shaped structure, placed on or near the ground (*Panurinae*) etc. Eggs variable in shape and colour.

Observations. The family *Paridae*, as here defined, is certainly a rather heterogenous group, the last two subfamilies, *Paradoxornithinae* and *Certhiparinae*, being of somewhat doubtful affinities, yet they appear to be more nearly related to the *Paridae* than to any other family.

Bibliography. Gadow, Cat. Birds Brit. Mus. Vol. 8, 1883, pp. 1-79; Hellmayr, Tierreich, Livr. 18, 1903, pp. 29-167; Ridgway, Bull. U. S. Nat. Mus. no. 50, Pt. 3, 1904, pp. 375-436 1).

KEY TO THE SUBFAMILIES OF PARIDÆ

1. *Exposed culmen decidedly shorter than inner toe (without claw.)* [*Nasal opening concealed by antrorse latero-frontal plumules*]. *Tarsus nearly twice as long as middle toe (without claw)* 2.
- *Exposed culmen equal to, or longer than, inner toe (without claw). Tarsus much less than twice as long as middle toe (without claw). First primary about half as long as second* 3.
- *Exposed culmen about equal to inner toe (without claw). Tarsus more than twice as long as middle toe (without claw). First primary much more than half as long as second. Second primary equal in length to secondaries.* 4.
2. *Nasal fossa occupying about basal half of maxilla, nasal opening non-operculate, roundish. Maxilla abruptly contracted terminally, with culmen strongly ridged. Under tail coverts much less than half as long as longest rectrices. First primary well-developed, nearly half as long as second* 2. Subfam. PSALTRIPARINÆ.
- *Nasal fossa occupying much less than basal half of maxilla, broadly operculate, with slit like nasal opening situated near lower edge of groove. Maxilla not abruptly contracted, though narrow, terminally, with culmen above much rounded. Under tail coverts fully half as long as longest rectrices. First primary rudimentary, reduced to a minute, lanceolate feather, not reaching to tip of primary coverts* 5. Subfam. PANURINÆ.

1. Mr. Ridgway's admirable work has been of the greatest assistance to me in the preparation of this revision, and most of the family- and generic characters have been taken from it.

3. Bill with either culmen or gonys (usually both) distinctly convex, its tip not acute. First primary about half as long as second, the latter always shorter than seventh. Rectal bristles distinct. 1. Subfam. PARINÆ.
- Bill with both, culmen and gonys, nearly straight, its tip acute. First primary decidedly less than half as long as second, usually rudimentary, scarcely exceeding primary-coverts, the second longer than seventh. Rectal bristles obsolete 3. Subfam. REMIZINÆ.
4. Bill extremely elevated, very much deeper than wide, with outlines strongly convex, and culmen much rounded above; maxillary tomium more or less deeply sinuated. Nostrils non-operculate, small, roundish, entirely concealed by dense, antrorse, latero-frontal plumules. 4. Subfam. PARADOXORNITHINÆ.
- Bill not elevated, as wide as, or even wider than, deep, with culmen but slightly convex for terminal half and distinctly ridged; maxillary tomium without trace of sinuation. Nostrils distinctly operculate, large, longitudinal, posteriorly overhung by bristly latero-frontal plumules. 6. Subfam. CERTHIPARINÆ.

1. SUBFAM. PARINÆ

THE TITMICE

In this group I include, besides the true Tits (*Parus*), the old-world genera *Melanochlora*, *Penthornis*, *Parisoma* (s. strict.), *Aphelocephala* and *Sphenostoma*. They are all, without exception, small-sized birds with rather strong, distinctly convex, more or less blunt bill, rounded, even or slightly emarginate tail, composed of equally broad rectrices, and with inter-orbital septum without any large, central foramen.

Characters. Bill relatively small, much shorter than head, about equal to, or longer than, inner toe without claw, much longer than deep, with either culmen or gonys (usually both) distinctly convex, its tip not acute; maxillary tomium with or without subterminal notch. Nasal opening occupying much less than basal half of maxilla, either operculate and then mostly exposed, or non-operculate and concealed by antrorse latero-frontal plumules. Wing rather long, rounded; third, fourth and fifth, or fourth and fifth, primaries longest; second primary always shorter than seventh, equal either to eighth or to ninth; first primary about half as long as second. Tail variable as to relative length, even, rounded, or slightly emarginate; rectrices broad, more or less rounded at tip. Tarsus much less than twice as long as middle toe (without claw); acrotarsium distinctly scutellate; middle toe longest, outer toe slightly longer than inner; basal phalanx of middle toe adherent to inner toe for entire length, to outer toe for more than half its length; hallux equal in length to inner toe, but stouter. Interorbital septum without any large central foramen. Plumage soft and copious.

Coloration variable (see genera). Sexes sometimes alike, sometimes more or less different.

Geographical Distribution. Palearctic, Nearctic, Indo-Malayan, Australian and Ethiopian Regions.

Nidification. Nest either in holes of various kinds (*Parus*), or a free, bulky structure (*Aphelocephala*). Eggs mostly white, spotted with brownish red or light red (*Parus*), or fleshy white (*Aphelocephala*).

KEY TO THE GENERA OF PARINÆ

1. Nostrils non-operculate, small, roundish, entirely concealed by antrorse latero-frontal plumules. Tongue with distinct horny bristles. Upper tail coverts covering not more than basal third of tail, usually much less 2.
- Nostrils situated in a large operculated groove, nasal opening roundish, hidden by antrorse latero-frontal plumules. Tongue without bristles. Upper tail coverts long, covering basal half of tail 4. GENUS APHELOCEPHALA.
- Nostrils operculate, entirely exposed. Upper tail coverts short, covering much less than basal third of tail 4.
2. Bill decidedly longer than hallux (without claw), with culmen more abruptly curved, and tip of maxilla slightly uncinatè 2. GENUS PENTHORNIS.
- Bill about as long as hallux (without claw), with culmen less abruptly curved, and tip of maxilla not uncinatè 3.
3. Bill stout, much expanded at base; tail strongly rounded, the outermost rectrix falling short of the middle pair by length of inner toe with claw 3. GENUS MELANOCHLORA.
- Bill more slender, not expanded at base; tail even, emarginate, or very slightly rounded, the difference between longest and shortest rectrix being much less than length of inner toe with claw 1. GENUS PARUS.
4. Bill at base nearly as deep as wide, with culmen rounded and strongly curved for the whole of its length; no subterminal notch near end of maxillary tomium. Tail much longer than wing 5. GENUS SPHENOSTOMA.
- Bill at base decidedly wider than deep, much compressed terminally, with culmen nearly straight for basal half, rather abruptly decurved terminally; maxillary tomium with slight subterminal notch. Tail about equal to length of wing. 6. GENUS PARISOMA.

I. GENUS PARUS LINNÆUS

Parus Linnæus, Syst. Nat., ed. 10, p. 189 (1758) (type by elimination : *Parus major* Linnæus).

Lophophanes Kaup, Skizz. Entwicklungsgesch. pp. 91, 92 (1829) (type by elimination : *Parus cristatus* Linnæus).

Cyanistes Kaup, ibidem, p. 99 (1829) (type : *Parus cyanus* Pallas).

Pœcile (nec *Pœcilus* Bonelli 1809) Kaup, ibidem, p. 114 (1829) (type by elimination : *Parus palustris* Linnæus).

Sylviparus Burton, Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 154 (1836) (type : *Sylviparus modestus* Burton).

Pœcila Gray, Genera of Birds, Vol. 1, p. 191 (1848) (nom. emend. pro *Pœcile* Kaup).

Penthestes Reichenbach, Avium Syst. Nat. pl. 62 (1850) (type : *Parus lugubris* Temminck).

Melaniparus Bonaparte, Consp. Gen. Avium, Vol. 1, p. 228 (1850) (sp. : *P. niger*, *leucomelas*, *leucopterus*, *leuconotus*).

Machlolophus Cabanis, Mus. Heinean. Vol. 1, p. 91 (1851) (type : *Parus spilonotus*).

- Bæolophus** Cabanis, Mus. Heinean. Vol. 1, p. 91 (1851) (type : *Parus bicolor* Linnæus).
Pentheres Cabanis, ibidem, p. 92 (1851) (nom. emend. pro *Melaniparus* Bonaparte).
Pæcila Bonaparte, Ann. Sc. Nat. (4), Vol. 1, p. 121 (1854) (nom. emend. pro *Poecile* Kaup).
Poikilis J. H. Blasius, List Europ. Birds, p. 8 (1862) (nom. emend. pro *Poecile* Kaup).
Pæcilia Dybowski, Bull. Soc. Zool. Fr. Vol. 8, p. 361 (1883) (nom. emend. pro *Poecile* Kaup).
Sittiparus de Selys-Longchamps, ibidem, Vol. 9, pp. 43, 58 (1884) (type : *Parus varius* Temminck & Schlegel).
Periparus de Selys-Longchamps, ibidem, pp. 43, 59 (1884) (type : *Parus ater* Linnæus).
Pardaliparus de Selys Longchamps, ibidem, p. 73 (1884) (sp. : *P. elegans*, *P. amabilis*, *P. venustus*).
Phæopharus Madarász, Magyar Mad. p. 139 (1900) (type : *P. palustris* Linnæus).
Ægithospiza Hellmayr, Journ. f. Ornith. Vol. 49, p. 171 (1901) (type : *Parus fringillinus* Fischer & Reichenow).
Pæciloides Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 241 (1902) (type : *Poecile superciliosa* Przewalski).

Characters. Bill much shorter than head, extremely variable as to relative length, shape and size, sometimes slender, sometimes stout, but always more or less conic, with obtuse tip; culmen much rounded above, decidedly decurved terminally, without trace of subterminal notch; gonys more or less distinctly ascending terminally. Nostrils basal, roundish, small, non-operculate, completely concealed by dense, antrorse latero-frontal plumules. Rictal bristles obvious, though short and soft. Tongue obtuse, its tip beset with horny bristles. Wing rather long, but rounded; fourth and fifth, fourth, fifth and sixth, or third, fourth and fifth primaries longest; second primary equal to ninth or eighth, always shorter than seventh; first primary much less than half as long as second, but considerably longer than primary coverts. Tail extremely variable as to relative length, either much shorter, or conspicuously longer, than wing, rounded or emarginate, but never much graduated; rectrices rounded or slightly pointed at tip. Tarsus rather strong, conspicuously longer than middle toe with claw, or wing-tip; the acrotarsium distinctly scutellate; outer toe slightly longer than inner toe, its claw reaching to or beyond base of middle toe; hallux equal in length to outer toe, but much stouter, its claw much larger than those of anterior toes, sometimes nearly as long as the digit; basal phalanx of middle toe adherent to inner toe for its entire length, to outer toe for about half its length. Feathers of pileum often much elongated, forming a full, erect or pendant crest of various length and shape. Plumage woolly, soft and lax.

Coloration extremely variable. In some species the upper parts are plain brown or grey, the lower parts white, greyish or buff, without light markings on wings and tail; others are brightly-coloured birds, with the upper parts varied with black, yellow and green, the wings ornamented by bright yellow, white or bluish markings, the under surface bright yellow or white, with black throat and abdominal stripe. Often is there a distinct greyish or white nuchal patch, and the outer rectrices are partly white.

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan and Ethiopian Regions.

Habits and Nidification. The Tits are very active, omnivorous, non-migratory birds. Their nest, a very careless, loose structure of mosses, lichens, dry leaves etc., lined inside with feathers, hair and other soft material, is placed in holes of all kind; the clutch consists of from six to fourteen eggs, which are white, spotted all over with reddish brown or pale red.

Observations. I have been in considerable doubt about the propriety of uniting in a single genus the numerous species and subspecies commonly referred to *Parus*. However, several attempts to use the slight structural differences (in shape and size of bill, shape and relative length of tail) together with style of coloration as generic characters having entirely failed I see no other way out of the difficulty but the one here taken. With regard to the question of subdivision of this genus the remarks of Mr. Ridgway (Birds North- and Middle Amer. Vol. 3, p. 378) should be consulted.

KEY TO THE SPECIES AND SUBSPECIES OF PARUS ¹⁾

1. Head with a distinct, full occipital crest, the crest-feathers being either rounded, or slightly attenuated and recurved at the tip 2.
- Head without a distinct, full crest, the occipital feathers being either normally shaped, or very slightly lengthened (section *Cyanistes*, *Parus funereus*), or only a few of them are elongated (several forms of section *Periparus*) 24.
2. Plumage above uniform olive-green, lower parts paler. Above the eye a well-defined, bright lemon-yellow stripe, only to be seen when the feathers are raised 3. (*P. MODESTUS*).
- Plumage not uniform olive-green. No bright lemon-yellow stripe above the eye. 4.
3. Under parts pale dingy greenish, more yellowish in the middle of the abdomen 72 *P. MODESTUS MODESTUS*.
- Under parts duller, throat and breast more greyish green 73. *P. MODESTUS SATURATION*.
4. Upper wing coverts with large white or yellow apical spots. Head above metallic black, with a distinct pale nuchal patch, sides of head yellow, with a black streak from eye to sides of neck 5. (*MACHLOLOPHUS*).
- Upper wing coverts without trace of light apical spots. Head above never uniform metallic glossy black. No pale nuchal patch; sides of head without black streak 11.
5. Throat yellow like the remainder of under parts. Nuchal patch white. 6.
- Throat more or less black. Nuchal patch yellow. 7.
6. Head above like all the upper parts glossy greenish black; middle of the abdomen with a distinct black longitudinal stripe 50. *P. HOLSTI* ♂.
- Lateral portions of pileum washed with olive, back etc. dull greenish olive-grey; no blackish median stripe on the abdomen 50. *P. HOLSTI* ♀.
7. Forehead yellow, crown black 8.
- Forehead black like the crown 10.
8. Back bluish grey, spotted with black on anterior portion. Below: throat and middle of breast down to anal region black, sides and flanks clear cinereous 51. *P. REX* ♂.
- Back greenish, sometimes varied with blackish on upper portion. Below mainly yellow, with more or less of black on throat; flanks sometimes greyish 9.

¹⁾ *P. atricapillus sakhalinensis* could not be included in the key, being unknown to the author.

9. *Whole throat and broad stripe down the middle of breast and abdomen black; sides of breast bright yellow, flanks more greenish* 49. *P. SPILONOTUS.*
- *Upper throat only more or less black, foreneck and breast yellowish green, flanks and anal region ashy grey* 51. *P. REX ♀.*
10. *Back bright olive-green; apical spots to upper wing coverts pale yellow.* 47. *P. XANTHOGENYS XANTHOGENYS.*
- *Back dull greyish olive-green; apical spots to upper wing coverts pure white.* 48. *P. XANTHOGENYS APLONOTUS.*
11. *Bill slender, its depth at base equal to not more than half its length; tail emarginate; longer crest feathers recurved terminally* 12. (*LOPHOPHANES*).
- *Bill very stout, its depth at base equal to more than half the length of exposed culmen; tail more or less rounded; longer crest-feathers not recurved terminally* 16. (*BÆOLOPHUS*).
12. *Feathers of pileum and crest uniform mouse-grey; sides of head light buff, speckled with grey; throat and remaining lower parts deep buff* 13. (*P. DICHROUS*).
- *Feathers of forehead and crown black, broadly edged with white; crest-feathers black, edged and tipped with white; sides of head white, the auricular region surrounded above and behind by a broad black band. Middle of throat and foreneck black, remainder of lower parts white, tinged with brown on sides and flanks* 14. (*P. CRISTATUS*).
13. *Back olivaceous grey, scarcely different from colour of pileum; lower parts deep rusty buff.* 77. *P. DICHROUS DICHROUS.*
- *Back light olive-brown, decidedly contrasting with mouse-grey of pileum and crest; lower parts light buff* 78. *P. DICHROUS DICHROIDES.*
14. *Back and upper wing coverts lighter: greyish brown or clear wood-brown. Larger: wing of adult male about 63-68 mm* 15.
- *Back and upper wing coverts decidedly darker: deep olive-brown. Smaller: wing of adult male about 60-63 mm. (Flanks strongly washed with brownish.)* 76. *P. CRISTATUS SCOTICUS.*
15. *Back and upper wing coverts light isabelle-brownish, with a greyish cast. Flanks paler buff* 74. *P. CRISTATUS CRISTATUS.*
- *Back and upper wing coverts darker: wood-brown. Flanks more deeply buff* 75. *P. CRISTATUS MITRATUS.*
16. *Throat white or grey; no black on sides of head or neck* 17.
- *Throat black or partly so; a black band across end of auricular region and another across side of neck.* 23. (*P. WOLLWEBERI*).
17. *Above slate-grey or olive-grey, the head with black on forehead or crown, or else the forehead rusty; sides and flanks cinnamon-rufous or cinnamon-buff.* 18.
- *Above brownish grey or greyish brown, the head without any black or rusty; sides and flanks pale brownish grey or greyish brown* 20.
18. *Crown and crest grey, like back; forehead black or dusky* 81. *P. BICOLOR.*
- *Crown and crest black or blackish; forehead whitish or rusty* 19. (*P. ATRICRISTATUS*).
19. *Smaller: adult male averaging wing 71, tail 62 mm.; grey of upper parts darker, more strongly tinged with olive.* 82. *P. ATRICRISTATUS ATRICRISTATUS.*
- *Larger: adult male averaging wing 77, tail 67 mm.; grey of upper parts lighter, less tinged with olive* 83. *P. ATRICRISTATUS SENNETTI.*

20. *Smaller : wing of adult male averaging less than 70, of female not more than 68 mm.; upper parts browner* 84. *P. INORNATUS INORNATUS.*
- *Larger : wing of adult male averaging more than 70, of female more than 68 mm.; upper parts greyer* 21.
21. *Upper parts darker : brownish grey* 85. *P. INORNATUS MURINUS.*
- *Upper parts lighter : light brownish grey.* 22.
22. *Under parts more decidedly greyish; tail and tarsus longer, bill larger.* 86. *P. INORNATUS RIDGWAYI.*
- *Under parts more whitish; tail and tarsus shorter, bill smaller . .* 87. *P. INORNATUS CINERACEUS.*
23. *Darker : with grey of upper parts more olive; under parts light olive-grey* 79. *P. WOLLWEBERI WOLLWEBERI.*
- *Paler : with grey of upper parts clearer; under parts dull greyish white* 80. *P. WOLLWEBERI ANNEXUS.*
24. *Head all round black* 25.
- *Head not all round black, the cheeks and auricular region being either wholly white, greyish white, yellow, buff, pale rufous, or chestnut, or at least a distinct subocular band over the cheeks, beginning at base of bill, grey (P. griseiventris)* 38.
25. *Nape and upper back pale sulphur-yellow, rump delicate bluish grey. Lower parts (except black throat) bright yellow, flanks slightly shaded with greenish.* 109. *P. AMABILIS.*
- *No yellow whatever in the plumage* 26.
26. *Nape and upper back buffy greyish white, abruptly contrasted with the glossy black of head and lower rump. (Upper wing coverts and all the lower parts uniform black, more or less glossy.)* 38. *P. LEUCONOTUS.*
- *Nape and upper back not buffy greyish white, being either black like the pileum, or slaty or brownish grey like lower rump* 27.
27. *Upper wing coverts edged with slaty (sometimes the greater series slightly tipped with white), quills and rectrices without trace of white markings. (General colour dark slaty with slight greenish gloss, head and throat darker, blackish.)* 39. *P. FUNEREUS.*
- *Upper wing coverts with a large amount of white; quills and outer rectrices more or less broadly edged with white* 28.
28. *Back and upper tail coverts glossy black like the pileum* 29.
- *Back and upper tail coverts grey, abruptly contrasted with black of pileum.* 33.
29. *Lower breast, abdomen and under tail coverts white, abruptly contrasted with black of chest and throat* 37. *P. ALBIVENTRIS.*
- *Whole under surface black or slaty, though sometimes with abdomen rather duller than anterior lower parts; under tail coverts only with white edges.* 30.
30. *Greater upper wing coverts black, exteriorly edged with white. (Under parts slaty black in adults, paler, more greyish slate in females and young birds.)* 32. *P. NIGER NIGER.*
- *Greater upper wing coverts entirely white.* 31.
31. *Rectrices, except central pair, more or less distinctly edged with white. Wing 85-90 mm.* 33. *P. NIGER INSIGNIS.*

- *Rectrices uniform black, or the outermost pair only edged with white at tip and along outer web.* 32.
32. *Largest : wing 85-95 mm.* 36. *P. NIGER LACUUM.*
- *Middle-sized : wing 75-84 mm.* 35. *P. NIGER LEUCOMELAS.*
- *Smaller : wing 69-76 mm.* 34. *P. NIGER GUINEENSIS.*
33. *Foreneck and chest black like throat in males, somewhat duller, more brownish black in females; in both sexes a large glossy black patch, continuous to black of chest, occupying the middle of the breast.* 34.
- *Foreneck and chest grey, separating black of throat from colour of belly; no black patch in middle of breast.* 35.
34. *Sides of breast, and abdomen dingy white, flanks faintly washed with pale brownish grey.* 45. *P. FASCIVENTER FASCIVENTER.*
- *Sides of breast, and abdomen distinctly washed with buffy brown.* 46. *P. FASCIVENTER TANGANYICÆ.*
35. *Breast and abdomen deeper : cinnameous; flanks not greyish.* 36.
- *Breast and abdomen paler : fawn-colour or brownish buff; flanks washed with greyish.* 37.
36. *Cinnameous colour of belly deeper.* 40. *P. RUFIVENTRIS RUFIVENTRIS.*
- *Cinnameous colour of belly paler.* 41. *P. RUFIVENTRIS MASUKUENSIS.*
37. *Belly light fawn-colour.* 42. *P. RUFIVENTRIS PALLIDIVENTRIS.*
- *Belly brownish buff or buffy.* 43. *P. RUFIVENTRIS ROVUMÆ.*
38. *Forehead and crown without any black, the former being white, the latter either greyish white, or light or dark blue; across hindneck a broad band of dark blue or blackish blue. Under parts mainly white, or yellow, or composed of these two colours, often with black on throat and middle of breast.* 39. (*CYANISTES*).
- *Forehead, sides of head, nape band and under surface of body pale rufous, palest and shaded with greyish on abdomen. Crown feathers blackish, edged with grey, forming a well-defined cap.* 44. *P. FRINGILLINUS.*
- *Upper part of the head uniform black, only forehead sometimes differently coloured, with or without pale nuchal patch. With more or less black on throat.* 54.
39. *Chin and throat white, without any black. Top of the head whitish or very faintly shaded with pale bluish grey. Outer rectrices mostly white.* 40.
- *Chin and middle of throat black. Crown light or dark blue, abruptly contrasted with white forehead. Outer rectrices blue-grey, the outermost pair sometimes narrowly edged with white along outer web.* 43.
40. *Lower parts (except a more or less distinct blackish streak along middle of breast) uniform white.* 41.
- *Lower parts not uniform white, foreneck and chest being extensively bright yellow.* 42.
41. *Crown nearly pure white; grey at base of lateral rectrices indistinct and more restricted.* 68. *P. CYANUS CYANUS.*
- *Crown distinctly shaded with pale bluish grey; grey at base of lateral rectrices very distinct and more extended.* 69. *P. CYANUS TIANSHANICUS.*

42. *Behind the eye a very distinct bluish black stripe confluent with the broad, bluish black nuchal band* 70. *P. CYANUS FLAVIPECTUS.*
- *No blackish stripe behind the eye; bluish black nuchal band narrow, interrupted in the middle* 71. *P. CYANUS BEREZOWSKII.*
43. *Lower parts mostly white, with a more or less well-developed pale yellow patch on chest. Inner secondaries with broad, white apical spots. (Crown azure-blue, contrasted with white forehead. Wing about 65 mm.)* 67. *P. PLESKII.*
- *Lower parts yellow, with median portion of lower breast and abdomen more or less white. Inner secondaries but narrowly edged with white at tip* 44.
44. *Crown and band across occiput deep blackish blue, no whitish nuchal patch; upper back blue-grey or bluish grey, sometimes faintly washed with greenish* 45.
- *Crown and band across occiput much lighter, pale or dark azure-blue; a very large whitish or greyish white nuchal patch; back uniform olive-green or greyish green, without any bluish grey* 49.
45. *Lower back and rump olive-green, contrasting with blue-grey of upper back. (Greater upper wing coverts tipped with white; belly yellow with blackish abdominal stripe, but without any white.)* 65. *P. CÆRULEUS OMBRIOSUS.*
- *Whole back nearly uniform blue-grey, only the uropygium slightly washed with olive-greenish* 46.
46. *Greater upper wing coverts broadly tipped with white, forming a well-defined oblique wing-band* 47.
- *Greater upper wing coverts uniform dark blue, or very faintly edged with greyish white at tip, but never with a distinct white band.* . . . 64. *P. CÆRULEUS TENERIFFÆ.*
47. *Chest, sides and under tail coverts pale yellow, middle of breast and abdomen extensively white, without or with a very indistinct blackish stripe* 66. *P. CÆRULEUS PALMENSIS.*
- *All the breast and abdomen, including under tail coverts, deep yellow, with a very narrow, black and white stripe along middle of breast and abdomen* 48.
48. *Upper parts deeper blue-grey, abdomen deeper yellow* 62. *P. CÆRULEUS ULTRAMARINUS.*
- *Upper parts clearer bluish grey, abdomen paler yellow* 63. *P. CÆRULEUS DEGENER.*
49. *Back brighter, decidedly olive-green or yellowish green. Yellow of under parts deeper* 50.
- *Back duller, greyish green or greenish olive-grey. Yellow of under parts paler* 53.
50. *Back clearer, light olive-green. Size larger: wing of adult males averaging 68 mm.* 51.
- *Back darker, dull greenish olive. Size smaller: wing of adult males averaging 63-64 mm.* 52.
51. *Back more decidedly green, light nuchal area very faintly shaded with bluish grey, lateral interscapular feathers with scarcely any bluish tinge* 55. *P. CÆRULEUS CÆRULEUS.*

- *Back clearer, more yellowish green; light nuchal area and lateral interscapular feathers distinctly shaded with pale bluish grey* . . . 58. *P. CÆRULEUS ORIENTALIS.*
52. *Bill larger, stout. White tips to inner secondaries narrower and more sharply defined* 56. *P. CÆRULEUS OBSCURUS.*
- *Bill smaller, slender. White tips to inner secondaries wider* . . . 57. *P. CÆRULEUS OGLIASTRÆ.*
53. *Back decidedly pale greyish green or greyish olivaceous; breast and abdomen very pale yellow* 61. *P. CÆRULEUS PERSICUS.*
- *Back less tinged with greyish; breast and abdomen averaging darker yellow* } 60. *P. CÆRULEUS RADDEI.*
59. *P. CÆRULEUS SATUNINI.*
54. *Broad band across forehead (as well as lores, cheeks, malar- and auricular regions and sides of neck) deep buff or chestnut, abruptly contrasted with glossy black of pileum and nape; large nuchal patch of buff or chestnut; no light superciliary streak. Bill stout, with remarkably blunt tip.* 55. (SITTIPARUS).
- *Forehead either black like the pileum, or else, narrowly white and confluent with a well-defined superciliary stripe, reaching to the sides of the neck. Bill slender, with tip not remarkably obtuse.* 57.
55. *Forehead, nuchal patch, as well as sides of head and neck, chestnut-brown. Back dull olive, on anterior portion slightly mixed with chestnut* 54. *P. VARIUS OWSTONI.*
- *Forehead, nuchal patch, as well as sides of head and neck, deep buff. Back slate-grey* 56.
56. *Larger: wing of males 80-86, of females 74-76 mm. Upper back cinnamon-rufous; middle of breast and abdomen buff, sides and flanks clear cinnamon-rufous* 52. *P. VARIUS VARIUS.*
- *Smaller: wing of adult (type, not sexed) 65,5 mm. No cinnamon-rufous on upper surface, the whole back being deep slate-grey; all the lower parts below the black throat-patch uniform light chestnut.* 53. *P. VARIUS CASTANEOVENTRIS.*
57. *No whitish nuchal patch; greater upper wing coverts never tipped with white nor conspicuously edged with whitish* 58. (PENTHESTES).
- *A more or less distinct white or whitish nuchal patch in the center of the hindneck, or else, a distinct black stripe along middle line of belly* 110.
58. *A well-defined white superciliary streak* 59.
- *No white superciliary streak* 61.
59. *Under parts, below black throat, pale cinnamomeous* 115. *P. SUPERCILIOSUS.*
- *Under parts, below black throat and chest, dull white, sides and flanks olive grey* 60.
60. *Back, as well as sides and flanks, more purely grey; bill larger* . . . 117. *P. GAMBELI BAILEYÆ.*
- *Back, as well as sides and flanks, decidedly olive-grey; bill smaller* . . 116. *P. GAMBELI GAMBELI.*
61. *Head above deep black, the apical portion of the feathers with a distinct metallic gloss* 62.
- *Head above dull black (without metallic gloss), dark brown or greyish brown* 76.
62. *Under parts below the black throat uniform cinnamomeous* 121. *P. DAVIDI.*

- *Under parts below black throat not uniform cinnamomeous, being white or whitish medially, buff, olive-grey or olive-brown on sides and flanks* 63.
63. *Chin, throat and foreneck uniform black, abruptly defined against colour of breast. Sides and flanks olive-grey or olive-brown* 64.
- *Chin and middle of upper throat only uniform black, the black bases, on lower throat and foreneck, being almost completely concealed by the broad white tips. Sides and flanks buff* 66.
64. *Back olive-grey, edges of upper wing coverts and quills olive-greyish; sides of neck pure white, sides and flanks dingy olive-grey* . . . 118. *P. SCLATERI.*
- *Back dusky olive-brown, edges of upper wing coverts and quills olive-brown; sides of neck clouded with brownish; sides and flanks dark olive-brown* 65.
65. *Larger : wing 64-69, tail 56-58 mm., with sides and flanks more rufescent olive-brown* 120. *P. HYPERMELÆNUS DEJEANI.*
- *Smaller : wing 62, tail 49 mm., with sides and flanks deeper olive-brown without any rufescent tinge* 119. *P. HYPERMELÆNUS HYPERMELÆNUS.*
66. *Back as well as edges to upper wing coverts and quills decidedly brown, without or with very little greyish admixture. Sides decidedly buff* 67.
- *Back as well as edges to upper wing coverts and quills decidedly greyish, with little brownish admixture. Sides not perceptibly washed with buffy* 74.
67. *Smaller : wing of male averaging 64 mm., with back much darker, deep brown with a slight, but decided rufescent tinge* 125. *P. PALUSTRIS DRESSERI.*
- *Larger : wing of male averaging 66 mm., with back decidedly paler, earthy- or hair-brown without any rufescent tinge* 68.
68. *Sides and flanks strongly and extensively suffused with deep buff, sides of neck much clouded with dusky. Back deeper brown* 69.
- *Sides and flanks but faintly washed with pale buff, this colour gradually shading into the white area of the middle; sides of neck scarcely clouded with pale brownish. Back paler, ashy brown* 71.
69. *Back deep hair-brown; buff wash on sides and flanks strongly pronounced* 126. *P. PALUSTRIS ITALICUS.*
- *Back lighter brown; buff wash on sides and flanks paler* 70.
70. *Back warmer brown* 128. *P. PALUSTRIS KOREJEWI.*
- *Back lighter, sandy brown* 129. *P. PALUSTRIS HELLMAYRI.*
71. *Back darker and browner* 72.
- *Back paler and more greyish brown* 73.
72. *Back somewhat darker, more olive-brown. Bill averaging longer and stouter* 124. *P. PALUSTRIS LONGIROSTRIS.*
- *Back somewhat paler, more purely hair-brown. Bill averaging shorter and more slender* 123. *P. PALUSTRIS COMMUNIS.*
73. *Back decidedly greyish brown; edges to upper wing coverts and quills less brownish. Bill slender* 122. *P. PALUSTRIS PALUSTRIS.*

- Back decidedly more brownish; edges to upper wing coverts and quills more brownish. Bill stout 127. *P. PALUSTRIS STAGNATILIS*.
74. Larger, with longer tail: averaging in males 68, in females 64 mm. 75.
- Smaller, with shorter tail: averaging in males 60, in females 56 mm. 132. *P. PALUSTRIS HENSONI*.
75. Back nearly pure ashy grey. Bill slender 130. *P. PALUSTRIS BREVIROSTRIS*.
- Back slightly shaded with brownish. Bill stout, deep at base 131. *P. PALUSTRIS CRASSIROSTRIS*.
76. Back chestnut. (Pileum brown.) 77. (*P. RUFESCENS*).
- Back not chestnut, being either brown, grey, whitish grey or isabelle-colour 79.
77. Sides and flanks extensively chestnut. 77a.
- Sides and flanks pale brownish grey with little, if any, chestnut. 78.
- 77a. Smaller, with shorter tail (in male 52-55 mm.) 166. *P. RUFESCENS RUFESCENS*.
- Larger, with longer tail (in male 57-61 mm.) 167. *P. RUFESCENS VIVAX*.
78. Sides and flanks obviously tinged or intermixed with chestnut. 168. *P. RUFESCENS NEGLECTUS*.
- Sides and flanks without any chestnut, or with a very slight tinge of that colour. 169. *P. RUFESCENS BARLOWI*.
79. Sides and flanks bright wood-brown, fulvous, or rusty brown, distinctly, if not abruptly, contrasted with dingy white of middle portion of belly 80.
- Sides and flanks white or slightly tinged with buff. 89.
80. Pileum and nape much darker, coffee-brown or blackish brown. Bill stouter and longer (culmen about 11-12 mm.) 81. (*P. SONGARUS*).
- Pileum and nape much paler, drab- or greyish brown. Bill slender and shorter (culmen about 9-10 mm.) 82.
81. Pileum and nape dull brownish black, back bright isabelle-brown 151. *P. SONGARUS SONGARUS*.
- Pileum and nape dark coffee-brown, back paler and duller, sandy brown 152. *P. SONGARUS AFFINIS*.
82. Sides of neck white; sides and flanks wood-brown or fulvous 83. (*P. CINCTUS*).
- Sides of neck grey; sides and flanks rusty brown or cinnamon-brown 87. (*P. HUDSONICUS*).
83. Darker and browner above 84.
- Paler and more greyish above. 85.
84. Pileum greyish brown; rectrices edged with rufescent buff. Bill smaller, slender 158. *P. CINCTUS CINCTUS*.
- Pileum drab grey; rectrices edged with greyish. Bill larger, stout 159. *P. CINCTUS SAYANUS*.
85. Bill smaller: culmen about 9 mm. 162. *P. CINCTUS ALASCENSIS*.
- Bill larger: culmen about 10 mm. 86.
86. Sides and flanks paler, fawn-colour 160. *P. CINCTUS OBTECTUS*.
- Sides and flanks darker, wood-brown 161. *P. CINCTUS KOLYMENSIS*.
87. Larger (wing in male 66 mm. or more, in female 65 mm. or more). 88.
- Smaller (wing in male 64, in female 60-61 mm.) 165. *P. HUDSONICUS LITTORALIS*.
88. Paler and browner above, throat more sooty. 163. *P. HUDSONICUS HUDSONICUS*.
- Darker and less brown above, throat blacker 164. *P. HUDSONICUS COLUMBIANUS*.
89. Larger: with remarkably stout, deep and strong bill of a brownish horn-colour. Wing 70-80 mm. 90. (*P. LUGUBRIS*).
- Smaller: with exceedingly slender, small bill, which is uniform black. Wing 58-70 mm. 94. (*P. ATRICAPILLUS*).

90. *Pileum deep, velvety brownish black; black throat-patch abruptly defined against white of chest, not broken, on lower edge, by white tips to the feathers* 91.
- *Pileum dull blackish brown or deep brown; black throat-patch not abruptly defined against white of chest, but with posterior edge much broken by white tips to the feathers* 92.
91. *Upper parts decidedly earthy brown or greyish brown; sides and flanks tinged with pale buffy* 157. *P. LUGUBRIS ANATOLIÆ.*
- *Upper parts clear buffy grey; sides and flanks pure white like remainder of belly* 156. *P. LUGUBRIS DUBIUS.*
92. *Sides and flanks only washed with buffy, middle of breast and abdomen pure white or nearly so* 93.
- *Lower breast, abdomen and under tail coverts decidedly washed all over with buff* 155. *P. LUGUBRIS HYRCANUS.*
93. *Pileum decidedly blackish brown. Larger: wing 72-80, tail 63-68 mm.* 153. *P. LUGUBRIS LUGUBRIS*
- *Pileum dark seal-brown. Smaller: wing 70-74, tail 60-64 mm.* 154. *P. LUGUBRIS LUGENS.*
94. *Chin and whole throat black, only the feathers near posterior edge of this black area more or less conspicuously tipped with white* 95. (American forms).
- *Chin and middle of upper throat only black, while, on sides of throat and on lower throat, the black bases of the feathers are almost completely concealed by long white tips* 101. (Palæarctic forms).
95. *Black of throat with posterior edge much broken by white tips to feathers; greater wing coverts and secondaries conspicuously edged with white; tail relatively longer (difference between length of tail and length of wing decidedly less than length of culmen)* 96.
- *Black of throat with posterior edge more « solid », very abruptly defined against white of chest; greater wing coverts and inner secondaries edged with light grey; tail relatively shorter (difference between length of tail and length of wing much greater than length of culmen).* 99.
96. *Larger and paler: wing of male averaging 66 mm. or more, of female more than 62 mm.* 97.
- *Smaller and much darker: wing of male averaging 62, of female 59.5 mm.* 136. *P. ATRICAPILLUS OCCIDENTALIS.*
97. *Smaller and darker, with tail relatively shorter: male averaging wing 66, tail 61.5, female wing 63, tail 59-60 mm.* 133. *P. ATRICAPILLUS ATRICAPILLUS.*
- *Larger and paler, with tail relatively longer: male averaging wing 66, tail 65, female wing 64.5, tail 64 mm.* 98.
98. *Grey of back slightly darker and more buffy, the sides and flanks more strongly buffy* 134. *P. ATRICAPILLUS SEPTENTRIONALIS.*
- *Grey of back slightly paler and purer, the sides and flanks paler buffy, sometimes entirely white* 135. *P. ATRICAPILLUS TURNERI.*
99. *Larger, the back clearer grey* 100.

- *Smaller, the back more brownish grey* 139. *P. ATRICAPILLUS IMPIGER*.
100. *Grey of upper parts slightly darker* 137. *P. ATRICAPILLUS CAROLINENSIS*.
- *Grey of upper parts slightly paler* 138. *P. ATRICAPILLUS AGILIS*.
101. *Back and upper wing coverts decidedly brownish. Edges to inner secondaries buffy or brownish white* 102.
- *Back and upper wing coverts clearer, buffy grey. Edges to inner secondaries white or hoary* 107.
102. *Darker and more brownish above* 103.
- *Paler and less brownish, more greyish above* 106.
103. *Larger : wing 65-70 mm.* 147. *P. ATRICAPILLUS MONTANUS*.
- *Smaller : wing 57-64 mm.* 104.
104. *Smaller : wing 57-61 mm., with back etc. darker, deep greyish brown, and with flanks and ear coverts strongly shaded with rusty buff* 150. *P. ATRICAPILLUS KLEINSCHMIDTI*.
- *Larger : wing 58.5-64 mm., with back etc. not so dark, and with flanks and ear coverts much less suffused with buff* 105.
105. *Slightly darker above; wing averaging shorter : 58-62 mm.* 149. *P. ATRICAPILLUS RHENANUS*.
- *Slightly paler above; wing averaging longer : 60-64 mm.* 148. *P. ATRICAPILLUS SALICARIUS*.
106. *Larger, wing of male averaging 67.5 mm., with back etc. slightly paler and more greyish* 146. *P. ATRICAPILLUS ASSIMILIS*.
- *Smaller, wing of male averaging 62 mm., with back etc. slightly darker and more brownish* 145. *P. ATRICAPILLUS BIANCHII*.
107. *Back etc. exceedingly pale, whitish grey; edges to rectrices pure white; sides and flanks pure white, without the slightest buff tinge* 140. *P. ATRICAPILLUS KAMTSCHATKENSIS*.
- *Back etc. decidedly darker, clear buffy grey; edges to rectrices hoary; sides and flanks distinctly, though sometimes faintly, tinged with buffy* 108.
108. *Back etc. duller grey; size averaging smaller* 109.
- *Back etc. clearer grey; size averaging larger* 143. *P. ATRICAPILLUS BAICALENSIS*.
109. *Sides and flanks paler buff; tail longer : 57-62 mm.* 144. *P. ATRICAPILLUS BOREALIS*.
- *Sides and flanks deeper buff; tail shorter : 53-58 mm.* 141. *P. ATRICAPILLUS RESTRICTUS*.
110. *Without trace of black longitudinal stripe on middle of belly* 111.
- *With a very distinct black stripe along middle line of breast and abdomen* 136.
111. *Upper tail coverts glossy black, abruptly contrasted with colour of back* 112. (*PARDALIPARUS*).
- *Upper tail coverts grey, olive, or brown, but never black* 116. (*PERIPARUS*).
112. *Lower back and rump delicate blue-grey* 114. *P. VENUSTULUS*.
- *Lower back and rump light green* 113.
113. *Sides of head and neck white, faintly tinged with pale yellowish. White apical spots on median and greater upper wing coverts much restricted* 112. *P. ELEGANS EDITHÆ*.
- *Sides of head and neck bright yellow. Light apical spots on median and greater upper wing coverts large* 114.

114. *Upper back black, variegated with white and olive-green* 115.
 — *Upper back mostly white, with very little or no olive-green, and very little black* 111. P. ELEGANS ALBESCENS.
115. *Bill larger; with apical spots on upper wing coverts and rectrices nearly pure white; underneath, the black confined to chin and throat* 110. P. ELEGANS ELEGANS.
 — *Bill smaller; with apical spots on upper wing coverts and rectrices pale yellow; underneath, black of throat continued on to the chest* 113. P. ELEGANS MINDANENSIS.
116. *Upper wing coverts uniform, not tipped with whitish* 117.
 — *Median and greater upper wing coverts broadly tipped with whitish.* 120.
117. *Middle of breast and abdomen more or less extensively ferruginous.* 88. P. RUBIDIVENTRIS.
 — *Belly without any ferruginous.* 118.
118. *Larger: wing about 71-77 mm. Throat and chest black; sides of head and neck pure white.* 89. P. RUFONUCHALIS RUFONUCHALIS.
 — *Smaller: wing about 67-72 mm. Throat only black, chest, like abdomen, ashy grey or greyish white. Sides of head and neck buff.* 119.
119. *Breast and abdomen ashy grey, slightly shaded with brownish* 90. P. RUFONUCHALIS BEAVANI.
 — *Breast and abdomen dull greyish isabelle-colour, greyish white in the middle.* 91. P. RUFONUCHALIS PÆCILOPSIS.
120. *Black of throat paling into dark grey on chest, rest of belly ashy grey* 92. P. MELANOLOPHUS.
 — *Breast and abdomen never grey, being either pale yellow, white, whitish or buff.* 121. (P. ATER).
121. *Sides of head and neck as well as breast and abdomen pale sulphur-yellow.* 121a.
 — *Sides of head and neck pure white; breast and abdomen not sulphur-yellow; back brown, olive-grey or bluish grey* 122.
- 121a. *Back and upper tail coverts light olive greenish; sides and flanks greyish.* 96. P. ATER LEDOUCCI.
 — *Back olive-grey, washed with cinnamon, upper tail coverts, sides and flanks cinnamon brown* 93a. P. ATER HIBERNICUS.
122. *Black of throat continued over the entire chest; sides and flanks much darker, deep olive-grey or rufescent olive-brown.* 123.
 — *Black colour below confined to chin and throat; sides and flanks pale or deep buff, but never olive-grey nor olive-brown* 124.
123. *Sides and flanks dull olive-grey* 95. P. ATER ATLAS.
 — *Sides and flanks deep rufescent olive-brown* 108. P. ATER CYPRIOTES.
124. *Breast and abdomen nearly uniform deep buff or chamois, middle line scarcely paler than sides* 125.
 — *Sides and flanks only more or less deeply washed with buff, middle of breast and abdomen largely white or whitish* 127.
125. *Larger: wing 61-64 mm. Vertical feathers not or but slightly elongated. Breast and abdomen deeper, ochraceous buff* 102. P. ATER RUFIPECTUS.

- *Smaller : wing 54-59 mm. Vertical feathers much elongated.*
Breast and abdomen paler, chamois. 126.
126. *Back paler grey. Crest-feathers less elongated, not recurved terminally* 101. *P. ATER PEKINENSIS.*
- *Back darker grey. Crest-feathers more elongated, slightly recurved terminally* 103. *P. ATER AMODIUS.*
127. *Larger : wing 63-70 mm.* 128.
- *Smaller : wing 55-63, very rarely 64 mm.* 131.
128. *Bill slender, culmen about 12 mm.* 129.
- *Bill stout, culmen about 10-11 mm.* 130.
129. *Whole back dark olive-grey; sides and flanks decidedly washed with buff.* 106. *P. ATER DERJUGINI.*
- *Upper and middle back pure bluish grey (as in P. ater ater), rump only olive-grey; sides and flanks creamy white* 107. *P. ATER MOLTCHANOVI.*
130. *Back decidedly rufescent olive-brown* 104. *P. ATER PHÆONOTUS.*
- *Back dull brownish olive.* 105. *P. ATER MICHALOWSKII.*
131. *Upper back purely bluish grey, more or less contrasted with olive-grey of rump* 132.
- *Upper back olive-grey like the rump* 134.
132. *Bill thicker, stronger, its depth at base about 7.5-8.2 mm. Buff tinge on sides and flanks paler and more restricted; white apical spots on wing coverts smaller* 98. *P. ATER ATER.*
- *Bill slender, weaker, its depth at base rarely exceeding 7.5 mm. Buff tinge on sides and flanks brighter and more extended; white apical spots on wing coverts larger* 133.
133. *Back more purely blue-grey. Feathers of occiput distinctly elongated, as to form a slight crest* 100. *P. ATER INSULARIS.*
- *Back less purely bluish grey. Feathers of occiput not or very slightly elongated* 99. *P. ATER AMURENSIS.*
134. *Sides and flanks strongly washed with deep rusty buff* 94. *P. ATER VIEIRÆ.*
- *Sides and flanks much paler, light buff* 135.
135. *Back more strongly washed with olive; buff tinge on sides and flanks slightly paler* 93. *P. ATER BRITANNICUS.*
- *Back less decidedly washed with olive; buff tinge on sides and flanks deeper* 97. *P. ATER SARDUS.*
136. *Back deep black like the pileum.* 1. *P. NUCHALIS.*
- *Back never black, being either bluish grey, or light green, or ashy brown, in abrupt contrast with black of pileum* 137.
137. *Upper back either wholly light green, or at least, anterior portion strongly washed with that colour* 138.
- *Upper back bluish or blue-grey, without any green or with but a faint greenish sheen immediately behind the whitish nuchal patch, or uniform greyish or earthy brown* 150.
138. *Under parts lighter or deeper yellow, sometimes (P. m. aphrodite) creamy with more or less of yellow on chest* 139.
- *Under parts dingy creamy or buffy white, without any yellow* 147.

139. *Median upper wing coverts black, with broad, white edges, greater series black, exteriorly narrowly edged with blue and broadly tipped with white* 140. (P. MONTICOLUS).
- *Median upper wing coverts uniform pale bluish grey, greater series bluish grey, dusky on inner web, broadly tipped with white* 141. (P. MAJOR part.).
140. *Lower rump only grey; white tips to greater wing coverts and inner secondaries rather narrower* 2. P. MONTICOLUS MONTICOLUS.
- *Whole rump grey; white tips to greater wing coverts and inner secondaries rather wider* 3. P. MONTICOLUS INSUPERATUS.
141. *Green area above more restricted to upper back; yellow of under parts decidedly paler* 141a.
- *Green area above extended all over anterior and middle portions of back; yellow of under parts much deeper* 142.
- 141a. *Larger: wing of male 75 mm. and more, of female 71-74 mm.* } 10. P. MAJOR BLANFORDI 1).
 — *Smaller: wing of male 71-73, of female 68-70 mm.* 11. P. MAJOR ZAYROSSIENSIS 1).
 — *Smaller: wing of male 71-73, of female 68-70 mm.* 11a. P. MAJOR TERRÆSANCTÆ.
142. *Yellow of under parts duller, about sulphur-yellow.* 143.
- *Yellow of under parts deeper, more saturated, often mixed with creamy white* 145.
143. *Bill slenderer* 144.
- *Bill stout and deep* 5. P. MAJOR NEWTONI.
144. *Yellow of under parts slightly purer, the wedge-shaped white apical spot on the outermost rectrix more extended, abruptly defined* 4. P. MAJOR MAJOR.
- *Yellow of under parts slightly duller, the wedge-shaped white apical spot on outermost rectrix more restricted and rather obsolete* 7. P. MAJOR CORSUS.
145. *Tarsus longer: 20-22 mm. Yellow of under parts never admixed with creamy-white* 6. P. MAJOR EXCELSUS.
- *Tarsus shorter: 18-20 mm. Yellow of under parts often admixed with creamy-white* 146.
146. *Smaller: wing 67-69, tail 57-60 mm.* 9. P. MAJOR APHRODITE.
- *Larger: wing 68-74, tail 60-70 mm.* 8. P. MAJOR PELOPONNESIUS.
147. *White on outer rectrices much more extended, especially the penultimate pair entirely white, except a narrow, blackish stripe along basal half of inner web.* 23. P. MAJOR TIBETANUS.
- *White on outer rectrices much less extended, the penultimate pair blackish, with a short, wedge-shaped apical spot only white* 148.
148. *Larger: wing 69-75 mm.* 21. P. MAJOR MINOR.
- *Smaller: wing 65-70 mm.* 149.
149. *Greater portion of upper back olive-green* 22. P. MAJOR COMMIXTUS.
- *Only the anterior portion of upper back, next to the pale nuchal patch, olive-green* 24. P. MAJOR OKINAWÆ.

1) Owing to lack of material I am unable to say by which characters the two forms are distinguishable. Sarudny's long description is almost useless.

150. Tail very slightly rounded, the outermost rectrix being scarcely 5 mm. shorter than the longest 151. (African forms).
 — Tail much rounded, the outermost rectrix being at least 10 mm. shorter than the longest 156. (Palæarctic and Indian forms).
151. Cheeks, subocular region, ear coverts and sides of neck buffy white or white 152.
 — No white on sides of head, only with a pale grey band running from base of bill under the eye to lower portion of ear coverts . . . 31. P. GRISEIVENTRIS.
152. Inner web of remiges edged with isabelline. White area on sides of head bordered behind by a blackish band 153.
 — Inner web of remiges edged with white. White area on sides of head behind not bordered by black 154.
153. Whitish nuchal spot distinct; breast and abdomen more decidedly tinged with buff. 29. P. AFER THRUPPI.
 — Whitish nuchal spot obsolete; breast and abdomen scarcely tinged with buff. 30. P. AFER BARAKÆ.
154. Back earthy brown or greyish brown; edges to upper wing coverts and rectrices smoky white 26. P. AFER AFER.
 — Back bluish grey; edges to upper wing coverts and rectrices nearly pure white 155.
155. Whitish nuchal patch distinct. Bill larger 27. P. AFER CINERASCENS.
 — Whitish nuchal patch absent or obsolete. Bill smaller 28. P. AFER PARVIROSTRIS.
156. Upper parts very dark blue-grey; greater upper wing coverts blackish with blue-grey outer margin, the innermost only with a minute, white apical spot; rectrices without any white, sometimes the outermost with a very small, white tip 25. P. NIGRILORIS.
 — Upper parts light bluish grey or pale cinereous; greater upper wing coverts with broad, white or buffy greyish white apical spots, forming a wide transverse band on the wing; outer rectrices for greater part white 157. (P. MAJOR part.)
157. Upper parts light cinereous; sides of breast, flanks and under tail coverts pure white, with a very faint greyish shade on lower flanks 158.
 — Upper parts dark bluish grey; sides, flanks and under tail coverts dull buffy greyish 160.
158. Interscapulium sometimes slightly shaded with greenish; white of lateral rectrices more restricted, outermost rectrix with outer web and small spot at tip of inner web, penultimate rectrix with a limited apical spot white 12. P. MAJOR INTERMEDIUS.
 — Interscapulium never shaded with greenish; white of lateral rectrices much extended, outermost rectrix nearly entirely white, penultimate with whole outer web and a large portion of apical half of inner web white. 159.
159. Bill stouter, deeper. Tail longer : 77-81 mm. 13. P. MAJOR TURKESTANICUS.
 — Bill slender, less deep. Tail shorter : 68-76 mm. 14. P. MAJOR BOKHARENSIS.

160. Bluish grey of upper parts darker, without whitish nuchal patch; white of lateral rectrices less extended 20. *P. MAJOR SARAWACENSIS*.
 — Bluish grey of upper parts lighter, with distinct whitish or greyish white nuchal patch; white of lateral rectrices more extended 161.
 161. Central pair of rectrices black, narrowly edged with grey along outer web. 17. *P. MAJOR MAHRATTARUM*.
 — Central pair of rectrices wholly grey, or with but a narrow blackish line along the shaft 162.
 162. Nuchal patch darkened with greyish. Larger : wing 70-78, tail 68-72 mm. 15. *P. MAJOR CASCHMIRENSIS*.
 — Nuchal patch pure white or very nearly so. Smaller : wing 62-72, tail 53-65 mm. 163.
 163. Smaller : wing 61-65 mm., with larger, longer bill 19. *P. MAJOR HAINANUS*.
 — Larger : wing 64-68 mm., with smaller, shorter bill 164.
 164. White of lateral rectrices more extended 16. *P. MAJOR PLANORUM*.
 — White of lateral rectrices less extended. 18. *P. MAJOR CINEREUS*.

1. *Parus nuchalis* Jerdon.

Parus nuchalis Jerdon, Illustr. Ind. Ornith. pl. 46 (1843) (Eastern Ghâts, west of Nellore, Madras Presidency); Madras Journ. Vol. 13, II, 1844, p. 131, pl. 2.

Hab. Originally described from the Eastern Ghâts, Madras, and recorded from Bangalore, Mysore, in South India; but also found in the Aravalli Range from the country round Sâmbhar Lake to Deesa, in Rajputana, N. W. India.

Obs. The northern birds are most likely to be different from *P. nuchalis* of the Ghâts, but I have never been able to examine specimens from the type locality.

2. *Parus monticolus monticolus* Vigors.

Parus monticolus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 22 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 57.

Hab. Himalayas, from Kashmir to Bhutan, also in Assam, Manipur, and thence to the mountainous parts of Western and Southern China (Szechuen, Kansu, Hoopeh, Shensi etc.)

3. *Parus monticolus insperatus* Swinhoe.

Parus insperatus Swinhoe, The Ibis (new ser.), Vol. 2, pp. 308, 402 (1866) (Formosa).

Hab. Mountains of Formosa.

4. *Parus major major* Linnæus. (Pl. 1, Fig. 6; Pl. 2, Fig. 9.)

Parus major Linnæus, Syst. Nat., ed. 10, p. 189 (1758) (« Habitat in Europa ». We fix Sweden as type locality).

Parus Fringillago Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 555 (1827) (new name for *P. major* Linnæus : « per omniam Rossiam et Sibiriam »).

Parus robustus Brehm, Handb. Naturg. Vög. Deutschl. p. 461 (1831) (« liebt die Nadelhölzer », type locality : Germany).

Parus cyanotos Brehm, Vogelfang, p. 241 (1855) (« in Deutschland »).

Parus intercedens Brehm, ibidem, p. 241 (1855) (« kommt äusserst selten nach Mitteleuropa »; type, examined in Tring Museum, is a pale aberration).

Parus major verus Brehm, Naumannia, Vol. 6, p. 367 (1856) (Scandinavia, Germany).

Parus pallidus Brehm, ibidem, p. 367 (1856) (type from Greiz, Saxony, examined in the Tring Museum, is an abnormally pale specimen).

Parus maior sulfureus Kolibay, Journ. f. Ornith. Vol. 52, p. 459 (1904) (Bocche di Cattaro, Dalmatia).

Fig. Naumann, Vög. Deutschl. Vol. 4, pl. 94, f. 1.

Hab. Europe, from the Polar circle southwards to Spain, Italy, the northern Balkan states, east through Russia and Western Siberia as far as the Altai Mountains.

5. *Parus major newtoni* Prazák.

Parus major newtoni Prazák, Ornith. Jahrb. Vol. 5, p. 239 (1894) (England).

Hab. England, Scotland, Ireland.

6. **Parus major excelsus** Buvry.

Parus major excelsus Buvry, Journ. f. Ornith. Vol. 5, p. 194 (1857) (Forest Nratka-el-abbia, Northern Algeria).

Hab. Woods of Algeria, Tunisia and Morocco.

7. **Parus major corsus** Kleinschmidt.

Parus corsus Kleinschmidt, Ornith. Monatsber. Vol. 11, p. 6 (1903) (Corsica).

Hab. Corsica and Sardinia.

8. **Parus major peloponnesius** Parrot.

Parus major peloponnesius Parrot, Journ. f. Ornith. Vol. 53, p. 547 (1905) (Calamata, Greece).

Hab. Greece.

9. **Parus major aphrodite** Madarász.

Parus aphrodite Madarász, Term. Füzet. Vol. 24, p. 272 (1901) (Cyprus).

Hab. Cyprus; Asia Minor?

10. **Parus major blanfordi** Prazák.

Parus major blanfordi Prazák, Ornith. Jahrb. Vol. 5, p. 240 (1894) (Persien. Types from Teheran, North Persia, in the Vienna Museum examined).

Parus major caspius Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 109 (1905) (« bewohnt jene verschiedenen Provinzen, die an das Kaspische Meer grenzen [Ghilan, Masanderan und Asterabad] und ebenso die Wälder des Tieflandes von Talysch »).

Hab. North Persia; countries on the south shore of the Caspian Sea from Lenkoran to Asterabad.

11. **Parus major zayrossiensis** Sarudny & Loudon.

Parus maior zayrossiensis Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 108 (1905) (« System des Zagrosgebirges, südwestliches Persien »).

Hab. S. W. Persia: Zagros, Shiráz, Fars etc.

11a. **Parus major terræsanctæ** Hartert.

Parus major terræsanctæ Hartert, Vögel paläarkt. Fauna, Lief. 6, p. xxxii (1910) (Jerusalem).

Hab. Palestine.

12. **Parus major intermedius** Sarudny.

Parus boharensis var. *intermedius* Zarudnoï, Bull. Soc. Nat. Moscou (n. s.), Vol. 3, p. 789 (1890) (Mountains of South-western Transcaspia: « Karguy-Sou, Firousé, Gujarmaou, Soumbar and Tchandyr »).

Parus transcaspicus Zarudnoï, ibidem (n. s.), Vol. 7, p. 364 (1893) (new name for *P. boharensis* var. *intermedius*).

Hab. Mountains of North-east (east of Asterabad) and Eastern Persia, S. W. Transcaspia and southern parts of Afghanistan and Baluchistan.

13. **Parus major turkestanicus** Sarudny & Loudon.

Parus boharensis turkestanicus Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 109 (1905) (« bewohnt das Dsungarei-, Semiratschja- und Syr-Darja Gebiet »).

Hab. Turkestan (provinces of Syr-Darja and Semiretchje, Tian-shan), and Western Dsungaria (Dsharkent etc.).

14. **Parus major bokharensis** Lichtenstein.

Parus bokharensis Lichtenstein, in Eversmann's Reise nach Orenburg und Buchara, p. 131 (1823) (Bokhara).

Parus boharensis typicus Zarudnoï, Bull. Soc. Nat. Moscou (n. s.), Vol. 3, p. 789 (1890) (Plains of Tedshen, Murgab, Merw, Kara-ben etc.).

Hab. Plains of Transcaspia (Tedshen, Merw, Murgab), Bokhara, the valley of the Amu-Darja.

15. **Parus major caschmirensis** Hartert.

Parus major caschmirensis Hartert, Vögel paläarkt. Fauna, Lief. 3, p. 345 (1905) (Gilgit).

Hab. Mountains of Kashmir, N. W. India.

16. **Parus major planorum** Hartert.

Parus major planorum Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (South Punjab).

Hab. Plains of Northern India: Punjab, Rajputana, south probably to the Vindhya Range.

17. **Parus major mahrattarum** Hartert.

Parus major mahrattarum Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (Ceylon).

Hab. Indian Peninsula, from the Vindhya Range southwards, and Ceylon.

18. *Parus major cinereus* Vieillot.

Parus cinereus Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 316 (1818) (Batavia, Java).

Parus atriceps Horsfield, Trans. Linn. Soc. Lond. Vol. 13, p. 160 (1821) (Java).

Parus albigena Wilkes, Encycl. Lond. Vol. 18, p. 727 (1821) (based on Levaillant, Ois. d'Afr. Vol. 3, t. 139, fig. sup. [= f. 1] : S. Africa, errore!).

Parus nipalensis Hodgson, Ind. Review, Vol. 1, p. 31 (1837) (Nepal).

Parus cinereus (*P. caesius* Tickell MS.) Jerdon, Birds India, Vol. 2, p. 278 (1863) (India generally).

Fig. Temminck, Pl. Col. t. 287, f. 2.

Hab. Himalayas, from Simla to Bhutan, Assam, Western Burma, Malayan Peninsula, Greater and Lesser Sunda Islands, east to Flores and Alor.

19. *Parus major hainanus* Hartert.

Parus major hainanus Hartert, Novit. Zool. Vol. 12, p. 499 (1905) (Hainan).

Hab. Island of Hainan.

20. *Parus major sarawacensis* H. Slater.

Parus cinerascens (nec Vieillot 1818) H. Slater, The Ibis (5), Vol. 3, p. 122, pl. 4 (1885) (Bungal Hills, near Sarawak, N. Borneo).

Parus sarawacensis H. Slater, ibidem, p. 327 (1885) (nom. emend.).

Hab. Sarawak, North Borneo : Bungal Hills.

21. *Parus major minor* Temminck & Schlegel.

Parus minor Temminck & Schlegel, Fauna Japon. Aves, p. 70, t. 33 (1848) (« Japon »).

Parus major artatus, Thayer & Bangs, Bull. Mus. Comp. Zool. Harvard Coll., Vol. 52, p. 140 (1909) (Ichang, Hupeh, China) 1).

Hab. South-east Siberia (Ussuri, Amoorland), North China (southwards to the valley of the Yangtsekiang and Shanghai), Manchouria, and North Japan (Yezo, Hondo, Kiu-siu).

22. *Parus major commixtus* Swinhoe.

Parus commixtus Swinhoe, The Ibis (new ser.), Vol. 4, p. 63 (1868) (Amoy, South China).

Hab. Southern China, west to Upper Burma and Eastern Tenasserim.

23. *Parus major tibetanus* Hartert.

Parus major tibetanus Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 346 (1905) (Chaksam, Tsongpo-valley, Tibet).

Hab. Southern Tibet (Gyantse, Chaksam, Lhasa).

24. *Parus major okinawæ* Hartert.

Parus major okinawæ Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 346 (1905) (Okinawa-shima, Loo-choo Islands).

Hab. Okinawa Island, northern group of the Loo-choo Islands.

25. *Parus nigriloris* Hellmayr. (Pl. 1, Fig. 7.)

Parus nigriloris Hellmayr, Ornith. Monatsber. Vol. 8, p. 139 (1900) (Ishigaki, southern Loo-choo Islands).

Parus stejnegeri Bangs, Bull. Mus. Comp. Zool. Harvard Coll. Vol. 36, p. 267 (1901) (Ishigaki).

Hab. Ishigaki Island, southern group of the Loo-choo Islands.

26. *Parus afer afer* Gmelin.

Parus afer Gmelin, Syst. Nat. Vol. 1, 11, p. 1010 (1789) (based upon « Black-Breasted Titmouse », Latham, Gen. Syn. Birds Vol. 2, 11, p. 539 : « ad caput bonæ spei »).

Parus fuscus Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 309 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 139, f. 2 [inf.] : « dans les environs du Cap » 2).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 139, f. 2 (inf.).

Hab. South Africa : southern Cape Colony (Capetown, Deelfontein etc.).

27. *Parus afer cinerascens* Vieillot.

Parus cinerascens Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 316 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 138 : « dans les mimosas du Candéboo »).

1) I cannot find any constant difference between birds from Ussuri and Japan on one side, and those from Central China (Ichang, Shasi, Itu on the Yangtse; Ningpo near Shanghai) on the other.

2) Vieillot (loc. cit.) erroneously quotes pl. 134, f. 1, where *Anthoscopus m. minutus* is represented, but his description (les plumes « du dessus du corps et des ailes d'un brun terreux ») leaves no doubt that he intended to name the lower figure of plate 139.

Parus variegatus Wilkes, Encycl. Lond. Vol. 18, p. 726 (1821) (based on Levaillant, Ois. d'Afr. pl. 138; cfr. Cassin, Proc. Acad. Nat. Sc. Philad. Dec. 1867, p. 221).

Parus afer intermedius 1) (nec *P. boharensis* var. *intermedius* Sarudny 1890) Shelley, Birds Afr. Vol. 2, p. 241 (1900) (Potchefstroom, Transvaal).

Parus afer damarensis Reichenow, Ornith. Monatsber. Vol. 10, p. 77 (1902) (Damaraland).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 138.

Hab. South-western (Benguella, Damaraland) and South-eastern Africa (Oranje Colony, Transvaal; probably also in Lourenço Marques; Natal?).

28. *Parus afer parvirostris* Shelley.

Parus afer parvirostris Shelley, Birds Africa, Vol. 2, p. 241 (1900) (Salisbury, Mashonaland).

Hab. South Central Africa : Rhodesia (Salisbury, Ndola, Melssetter) and southern part of British Central Africa (Katanga on the lower Shiré River, south of Lake Nyasa).

29. *Parus afer thruppi* Shelley.

Parus thruppi Shelley, The Ibis (5), Vol. 3, p. 406, pl. 11, f. 2 (1885) (Plateau of northern Somaliland, south of Berbera).

Hab. Northern and Central Somaliland, southern limits not exactly known.

30. *Parus afer barakæ* Jackson.

Parus barakæ Jackson, The Ibis (7), Vol. 5, p. 639 (1899) (Njemps, British East Africa).

Hab. British East Africa (Njemps near Lake Baringo) and northern German East Africa (plains of Kilima Njaro : Taweta, Kahe, Taro).

31. *Parus griseiventris* Reichenow.

Parus griseiventris Reichenow, Journ. f. Ornith. Vol. 30, p. 210 (1882) (Kakoma).

Parus gilviventris (lapsu) Böhm, ibidem, Vol. 31, p. 207 (1883) (Kakoma).

Fig. Journ. f. Ornith. Vol. 34, 1886, pl. 2.

Hab. German East Africa : only known from Kakoma in southern Unjamwezi.

32. *Parus niger niger* Vieillot.

Parus niger Vieillot, Nouv. Dict. Hist. Nat. Vol. 20, p. 325 (1818) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 137 [♂ ♀] : « sur les bords des rivières Sondag, Swartekop et dans le pays des Caffres » i. e. South-eastern Africa).

Parus leucopterus Swainson, Birds West. Afr. Vol. 2, p. 42 (1837) (part. : new name for *P. niger* Vieillot with which the author erroneously unites the birds from « Senegal »).

Parus luctuosus Lichtenstein, Nomencl. Avium Mus. Berol. p. 36 (1854) (nom. nud.).

Parus xanthostomus Shelley, Bull. Brit. Ornith. Club, Vol. 1, p. 6 (1892) (« in terrâ Zambesianâ »; = juv.).

Parus fülleborni Reichenow, Ornith. Monatsber. Vol. 8, p. 5 (1900) (Undis, Nyasaland; = ♀).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 137 (♂ ♀); Shelley, Birds Afr. Vol. 2, pl. 10, f. 1 (juv.).

Hab. South Africa, northward as far as the Cunene, in the west, and Pangani River (Useguha), in the east 2).

33. *Parus niger insignis* Cabanis.

Parus (Pentheres) insignis Cabanis, Journ. f. Ornith. Vol. 28, p. 419 (1880) (Angola).

Hab. South-west and Central Africa : from Angola east to Nyasaland and to west shore of Lake Tanganyika.

34. *Parus niger guineensis* Shelley.

Parus guineensis Shelley, Birds Africa Vol. 2, p. 229 (1900) (West Africa).

Hab. Western Africa : from Senegal to the Niger.

35. *Parus niger leucomelas* Rüppell.

Parus leucomelas Rüppell, Neue Wirbelthiere, Vög. p. 100, pl. 37, f. 2 (1835) (Taranta Mountains, Temben, Abyssinia).

1) According to Prof. Neumann (in litt.) scarcely distinguishable from Damaraland specimens by its slightly darker grey back. If separable it would require a new name.

2) Very likely two races can be distinguished : one, the true *P. n. niger*, inhabiting South and S. E. Africa, and another undescribed in Damaraland. *P. xanthostomus* (type in Brit. Mus. examined) and *P. fülleborni* (fide Neumann in litt.) are certainly nothing but youngish females of *P. n. niger*.

Penihestes melanoleucus Württemberg, Naumannia, Vol. 7, p. 433 (1857) (nom. nud.).

Fig. Rüppell, Neue Wirbelthiere, Vög. pl. 37, f. 2.

Hab. North-east Africa : Abyssinia and Shoa.

N. B. The records of this species from the Victoria Nyanza require confirmation. The birds from this district very likely represent a distinct form.

36. **Parus niger lacuum** Neumann.

Parus niger lacuum Neumann, Journ. f. Ornith. Vol. 54, p. 260 (1906) (Suksuki River, South Ethiopia).

Hab. North-eastern Africa : Lake-district south of the Hawash and Omo-region.

37. **Parus albiventris** Shelley.

Parus albiventris Shelley, The Ibis (4), Vol. 5, p. 116 (1881) (Uzogo).

Fig. Shelley, Birds Africa, Vol. 2, pl. 10, f. 2.

Hab. Southern Brit. East Africa (Elgeju, Mau) and German East Africa : from the Victoria Nyanza south to the Rovuma River.

N. B. Perhaps merely a geographic form of the *P. niger*-group, but exact limits of range as compared with that of *P. n. niger* not yet sufficiently established.

38. **Parus leuconotus** Guérin.

Parus leuconotus Guérin-Ménéville, Rev. Zool. Vol. 6, p. 162 (1843) (« Abyssinie »).

Parus dorsatus Rüppell, Syst. Uebers. Vög. N.-O. Afr. p. 42, pl. 18 (1845) (Abyssinia).

Fig. Ferrest & Galinier, Voy. Abyssinie, Vol. 3, pl. 9, f. 1.

Hab. North-eastern Africa : Highlands of Abyssinia and Shoa, southward as far as Djamdjam-country.

39. **Parus funereus** (J. & E. Verreaux). (Pl. 1, Fig. 3.)

Melanoparus funereus J. & E. Verreaux, Journ. f. Ornith. Vol. 3, p. 104 (1885) (Gaboon).

? *Parus nigricinereus* Jackson, Bull. Brit. Ornith. Club, Vol. 8, p. 22 (1898) (Nandi, Equatorial Africa).

Fig. The Ibis (7), Vol. 5, 1899, pl. 13 (*P. nigricinereus*).

Hab. Western Africa (Gold coast, Camaroons, Gaboon); Equatorial Africa (Nandi, Ruwenzori).

N. B. This little-known species may, after all, be divisible into two races, in which case the name *P. nigricinereus* would have to be retained for the eastern form.

40. **Parus rufiventris rufiventris** Barboza du Bocage.

Parus rufiventris Barboza du Bocage, Journ. Acad. Lisboa, Vol. 6, p. 161 (1877) (Caconda, Benguela).

Fig. Barboza du Bocage, Ornith. Angola, pl. 10, f. 1.

Hab. S. W. Africa : Angola, Benguela, Congo-basin (Stanley-pool, Léopoldville etc.).

41. **Parus rufiventris masukuensis** Shelley.

Parus masukuensis Shelley, Birds Africa, Vol. 2, p. 238 (1900) (Nyika Plateau and Masuku Range).

Hab. British Central Africa : Masuku Range and Nyika Plateau, west of Lake Nyasa; N. E. Rhodesia : Ulungu Mt., West Loangwa district.

42. **Parus rufiventris pallidiventris** Reichenow.

Parus pallidiventris Reichenow, Journ. f. Ornith. Vol. 33, p. 217 (1885) (Kakoma).

Fig. Reichenow, Vög. Afr. Vol. 3, pl. [18].

Hab. German East Africa : Kakoma in southern Unjamwezi.

43. **Parus rufiventris rovumæ** Shelley.

Parus rovumæ Shelley, Bull. Brit. Ornith. Club, Vol. 1, p. 6 (1892) (« prope flumen Rovuma dictum in Africa orientale »).

Hab. Coast districts of Eastern Africa, from Useguha southward to the lower Zambezi and Mashonaland (Salisbury).

44. **Parus fringillinus** Fischer & Reichenow.

Parus fringillinus Fischer & Reichenow, Journ. f. Ornith. Vol. 32, p. 56 (1884) (foot of Meru Mountain).

Fig. Zeitschr. ges. Ornith. Vol. 1, 1884, pl. 19.

Hab. German East Africa : Masailand (plains on the foot of the Meru Mountain).

45. **Parus fasciiventer fasciiventer** Reichenow.

Parus fasciiventer Reichenow, Ornith. Monatsber. Vol. 1, p. 31 (1893) (Ruwenzori).

Fig. Reichenow, Vög. Afr. Vol. 3, pl. [18].

Hab. Central Africa : Ruwenzori Range.

46. *Parus fasciiventer tanganjicæ* Reichenow.

Parus fasciiventer tanganjicæ Reichenow, Ornith. Monatsber. Vol. 17, p. 42 (1909) (Forests west of Lake Tanganyika).

Hab. Central Africa : Forests west of Lake Tanganyika.

47. *Parus xanthogenys xanthogenys* Vigors.

Parus xanthogenys Vigors, Proc. Comm. Zool. Soc. Vol. 1, p. 23 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 52; Contrib. Ornith. 1852, t. [87], f. 1.

Hab. Western Himalaya, from Murree to Eastern Nepal, at elevations of from 4000 to 7000 feet.

48. *Parus xanthogenys aplonotus* Blyth 1).

Parus aplonotus Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 444 (1847) (« Mountains of Central India »).

Parus ferdoni Blyth, ibidem, Vol. 25, p. 445 (1856) (Bombay).

Fig. Gould, Birds Asia, Vol. 2, pl. 54.

Hab. The peninsula of India, south of a line drawn from Abu to Pareshnath in Behar, up to elevations of 6000 feet.

49. *Parus spilonotus* Blyth.

Parus spilonotus Blyth, Cat. Birds Mus. Asiat. Soc. p. 103 (1849) (name based on *P. xanthogenys* [nec Vigors] Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, 1847, p. 445 : Himalayas).

Parus subviridis (Tickell MS.) Blyth, Journ. Asiat. Soc. Bengal, Vol. 24, p. 267 (1855) (« mountainous interior of Tenasserim provinces »).

Fig. Gould, Birds Asia, Vol. 2, pl. 53; Contrib. Ornith. 1852, pl. [87], f. 2.

Hab. Eastern Himalayas (Nepal, Sikkim), Assam, Khásia Hills, Manipur, Burma, Tennasserim, at elevations of from 3000 to 6000 feet 2).

50. *Parus holsti* Seebohm.

Parus holsti Seebohm, Bull. Brit. Ornith. Club, Vol. 4, p. 7 (1894) (Interior of Formosa).

Fig. The Ibis (7), Vol. 1, 1897, p. 211, pl. 6.

Hab. Mountains of Formosa.

51. *Parus rex* A. David. (Pl. 1, Fig. 2.)

Parus (Macholophus) rex A. David, Ann. Sc. Nat. (5), Vol. 19, art. no. 9, p. 4 (1874) (« Koatén, Fokien occidental »).

Fig. David & Oustalet, Ois. Chine, p. 286, pl. 36.

Hab. Mountains of South China (West Fohkien) and Tonkin.

52. *Parus varius varius* Temminck & Schlegel 3).

Parus varius Temminck & Schlegel, Fauna Japon. Aves, p. 71, pl. 35 (1848) (« Japon »).

Parus sieboldi Seebohm, Birds Japanese Emp. p. 85 (1890) (new name for *P. varius*).

Parus rubidus Blakiston, The Ibis, Vol. 4, p. 321 (1862) (err. typ.).

Fig. Fauna Japon. Aves, pl. 35.

Hab. Japan (Hondo, Yezo) and Corea.

53. *Parus varius castaneoventris* Gould.

Parus castaneoventris Gould, Proc. Zool. Soc. Lond. 1862, p. 280 (1863) (Formosa).

Parus cinnamomeiventris Gray, Handlist Birds, Vol. 1, p. 231 (1869) (err. typ.).

Fig. Gould, Birds Asia, Vol. 2, pl. 49.

Hab. Formosa.

1) A doubtful species is :

Parus griffithii Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 445 (1847) (« between Assam and Ava »).

This supposed species has been based on a drawing of a bird obtained by Dr. Griffith, between Assam and Ava. It is said to differ from *P. x. xanthogenys* and *P. x. aplonotus* by lacking the crest and by having the upper parts black (instead of olive) and the back spotted with yellow.

2) Having never seen any Tenasserim specimens I cannot vouch for *P. subviridis* being really a synonym of *P. spilonotus*. Blyth's original description certainly suggests a bird different from the latter, unless it be taken from a young or immature example.

3) A nearly allied form appears to inhabit Okinawa-shima, central group of the Loo-choo Islands (see Stejneger, Proc. U. S. Nat. Mus. Vol. 9, 1886, p. 650). The single female is stated to be smaller than *P. v. varius* (wing 67 instead of 76-86 mm.) and somewhat different in coloration : chestnut patch on upper back smaller, flanks paler etc. In size it is thus seen to be intermediate between *P. v. varius* and *P. v. castaneoventris*.

54. **Parus varius owstoni** Ijima. (Pl. 2, Fig. 8.)

Parus Owstoni Ijima, Döbutsugaku Zasshi, Yokohama, no. 62 (1893) (Myiakeshima [Seven Islands, Idzu, Japan]); Ornith. Monatsber. Vol. 5, 1897, pp. 143-144 (reprint).

Hab. Japan, Seven Islands : Myiake and Fachijio.

55. **Parus caeruleus caeruleus** Linnæus.

Parus caeruleus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) (« Habitat in Europa »; we fix Sweden as type locality).

Parus erectus P. L. S. Müller, Natursystem, Suppl. p. 178 (1776) (ex Buffon, Europa).

Parus coerulescens Brehm, Handb. Naturg. Deutschl. p. 463 (1831) (« sie bewohnt Mitteldeutschland »).

Parus caeruleus pallidus (nec *P. pallidus* Brehm 1856) H. Grote, Ornith. Monatsber. Vol. 10, p. 181 (1902) (Lessnóje near St.-Petersbourg; type examined).

Parus caeruleus languidus H. Grote, Journ. f. Ornith. Vol. 52, p. 307 (1904) (nom. emend. for *P. c. pallidus* Grote).

Parus caeruleus calamensis Parrot, Verhandl. Ornith. Ges. Bayern, Vol. 7, p. 28 (1908) (Calamata, Greece).

Fig. Naumann, Vög. Deutschl. Vol. 4, pl. 95, ff. 1, 2.

Hab. North-, Central- and South Europe : in Scandinavia northwards to 64° latitude, in the Russian Empire only in the Baltic Provinces (St. Petersburg, Livland, Esthland etc.), Poland and in the southern gouvernements down to the northern slopes of the Caucasus. Common in Austria, Hungary, on the Balkan Peninsula, in Italy, Germany, Switzerland and France. Doubtfully recorded from Asia Minor and Transcaucasia. Specimens from Spain and Portugal are probably different.

56. **Parus caeruleus obscurus** Prazák.

[*Parus caeruleus*] *obscurus* Prazák, Ornith. Jahrb. Vol. 5, p. 246 (1894) (England).

Hab. Great Britain and Ireland.

57. **Parus caeruleus ogliastræ** Hartert.

Parus caeruleus ogliastræ Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 349 (1905) (Lanusei, Ogliastræ-district, Eastern Sardinia).

Hab. Sardinia and Corsica.

58. **Parus caeruleus orientalis** (Sarudny & Loudon).

Cyanistes caeruleus orientalis Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 105 (1905) (Eastern Governments of European Russia).

Hab. East Russia : Governments of Orenburg, Ufa, Samara, Kasan, Simbirsk.

59. **Parus caeruleus satunini** (Sarudny).

Cyanistes caeruleus satunini Sarudny, Ornith. Monatsber. Vol. 16, p. 6 (1908) (Lenkoran, Kumbashinsk (Talysh) etc., N. Persia).

Hab. Northern Persia : vicinity of Lenkoran and Kumbashinsk (Talysh), Kaswin and Transcaspiian Mountains.

60. **Parus caeruleus raddei** Sarudny.

Cyanistes caeruleus raddei Sarudny, Ornith. Monatsber. Vol. 16, p. 5 (1908) (« in den persischen Provinzen Astera-bad, Masanderan und Ghilan »).

Hab. North Persia : Elburz Mountains, provinces of Asterabad, Mazanderan and Ghilan.

61. **Parus caeruleus persicus** Blanford.

Parus (Cyanistes) persicus Blanford, The Ibis (3), Vol. 3, p. 89 (1873) (« in quercetis prope urbem Shiraz »).

Fig. Blanford, East. Persia, Vol. 2, Zool. pl. 16, f. 2.

Hab. Oak-woods of S. W. Persia (Shiraz, Zagrosh, Fars etc.).

62. **Parus caeruleus ultramarinus** Bonaparte.

Parus ultramarinus Bonaparte, Rev. Zool. Vol. 4, p. 146 (1841) (« habite la régence de Tunis, ... et notamment à Sfax »).

Parus caeruleanus Malherbe, Bull. Soc. Moselle, Vol. 3, p. 58 (1845) (Bône, Algeria).

Fig. Journ. f. Ornith. Vol. 38, 1890, pl. 4, f. 1.

Hab. Tunis, Algeria, Morocco.

63. **Parus caeruleus degener** Hartert.

Parus caeruleus degener Hartert, Novit. Zool. Vol. 8, pp. 309, 322 (1901) (Fuerteventura and Lanzarote).

Cyanistes ultramarinus insularis (nec *P. ater insularis* Hellmayr) Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 252 (1902) (ex Meade-Waldo, The Ibis (6), Vol. 5, 1893, p. 190 : Fuerteventura and Lanzarote).

Hab. Eastern Canary Islands : Fuerteventura, Lanzarote.

64. ***Parus cæruleus teneriffæ* Lesson.**

Parus Teneriffæ Lesson, Traité d'Ornith. p. 456 (1831) (Ténériffe).

Parus violaceus Bolle, Journ. f. Ornith. Vol. 2, p. 455 (1854) (Canary Islands).

Fig. Dresser, Birds Eur. Vol. 9, pl. 660, fig. inf.; Journ. f. Ornith. Vol. 38, 1890, pl. 4, f. 2.

Hab. Canary Islands : Teneriffe, Gran Canaria, Gomera.

65. ***Parus cæruleus ombriosus* Meade-Waldo.**

Parus ombriosus Meade-Waldo, Ann. Mag. Nat. Hist. (6), Vol. 5, p. 103 (1890) (Hierro).

Fig. Dresser, Birds Eur. Vol. 9, pl. 661; The Ibis (6), Vol. 2, 1890, pl. 13.

Hab. Canary Island : Hierro.

66. ***Parus cæruleus palmensis* Meade-Waldo.**

Parus palmensis Meade-Waldo, Ann. Mag. Nat. Hist. (6), Vol. 3, p. 490 (1889) (Palma).

Fig. Dresser, Birds Eur. Vol. 9, pl. 660, fig. sup.; The Ibis (6), Vol. 1, 1889, pl. 16.

Hab. Canary Island : Palma.

67. ***Parus pleskii* Cabanis.**

Parus (Cyanistes) Pleskii Cabanis, Journ. f. Ornith. Vol. 25, p. 213, pl. 3, f. 1 (1877) (St. Petersburg).

Parus pleskei var. *palescens* Hellmayr, Journ. f. Ornith. Vol. 49, p. 175 (1901) (North Russia).

Fig. Dresser, Birds Eur. Vol. 9, pl. 659; new edition of « Naumann. », Vol. 2, pl. 18, f. 8; Menzbier, Ornith. Geogr. Eur. Ross. Vol. 1, 1882, pl. 1 (*palescens*).

Hab. Only known breeding place : Motiwilowka, Gouv. Kiev, South Russia. Beyond breeding time specimens have been taken near St. Petersburg, Moskow and Orenburg.

Obs. This form is still imperfectly known. Hartert considers it to be a geographic race of *P. cæruleus*, but this opinion is not supported by its having been found breeding within the area occupied by *C. c. cæruleus*. The examples named *palescens* may be hybrids between *P. pleskei* and *P. cyanus cyanus*.

68. ***Parus cyanus cyanus* Pallas. (Pl. 1, Fig. 11.)**

Parus cyanus Pallas, Nov. Comment. Acad. Petrop. Vol. 14, 1, p. 498, pl. 13, f. 1 (1770) («... a Volgensibus regionibus datur avicula, cuius patria, qua latissime ad orientem patet Sibiria extenditur, ubi ab accuratissimo quondam Messerschmidio passim observata et pro *Paro cæruleo* descripta fuit », Terra typica therefore Volga, S. Russia).

Parus saebyensis Sparrman, Mus. Carlson. Vol. 1, t. 25 (1876) (« Ad prædium Carlsonianum Saeby in Sudermannia detecta est »).

Parus Knjaesckii Gmelin, Syst. Nat. Vol. 1, II, p. 1013 (1789) (« in Sibiriae quercetis »; ex Lepechin, iter, Vol. 1, p. 181, 1770).

Parus cyanus and *Parus elegans* Brehm, Vogelfang, p. 242 (1855) (« beide kommen aus Asien sehr selten nach Europa, bis Deutschland »).

Fig. Dresser, Birds Eur. Vol. 3, pl. 114.

Hab. Eastern Russia and West Siberia, exact eastern limits yet to be determined, though it is certainly this form which occurs in the Governments Omsk and Tomsk.

69. ***Parus cyanus tianschanicus* (Menzbier). (Pl. 1, Fig. 12.)**

Cyanistes cyanus var. *tian-schanicus* Menzbier, Bull. Soc. Zool. Fr. Vol. 9, p. 276 (1884) (« dans les montagnes qui bordent les déserts de l'Asie centrale au nord-ouest et à l'ouest »).

Hab. Mountains of Central Asia (Tian-shan, Altai, Alatau, Tarbagatai, Kwen-lun etc.) and Eastern Siberia to Amoorland.

70. ***Parus cyanus flavipectus* Severtzow.**

Parus flavipectus Severtzow, Izv. Obshs. Moskov. Vol. 8, no. 2, p. 133, pl. 8, f. 7 (1873) (Turkestan); Olphe-Galliard, Zeitschr. ges. Ornith. Vol. 4, 1887, p. 95 (transl.).

Fig. Menzbier, Ornith. Turkestan, pl. 10 (♂ ♀, juv.).

Hab. East Turkestan : valley of the Ferghana and Naryn Rivers.

71. ***Parus cyanus berezowskii* (Pleske).**

Cyanistes berezowskii Pleske, Bull. Brit. Ornith. Club, Vol. 3, p. 13 (1893) (Upper Chuanche, China).

Fig. Aves Przewalsk. t. 7, ff. 3, 4.

Hab. Mountain forests of the Upper Chuanche, West China, up to 8000 feet.

72. **Parus modestus modestus** (Burton).

Sylviparus modestus Burton, Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 154 (1836) (« apud montes Himalayensis »).

Parus (?) *minutus* Jerdon, Madras Journ. Vol. 11, p. 8 (1840) (« edge of northern Ghats »).

Parus seriophrys Blyth, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 942 (1844) (ex Hodgson MS. : Nepal).

Hab. Himalayas, from Kashmir to Bhutan, and mountains of Southern (Szechuen, Fohkien) and Central (Tsin-ling Range) China. Jerdon records it from Ajanta, Khandesh district. I have not seen specimens from this locality.

73. **Parus modestus saturator** (Rippon).

Sylviparus saturator Rippon, Bull. Brit. Ornith. Club, Vol. 16, p. 87 (1906) (Mount Victoria, southern Chin Hills, Burma).

Hab. Burma : Mount Victoria in the southern Chin Hills. Godwin-Austen's record of *S. modestus* from the eastern Barail Range (Japvo, Khunho), south of the Brahmaputra River, probably also refers to the present form.

74. **Parus cristatus cristatus** Linnaeus.

Parus cristatus Linnaeus, Syst. Nat., ed. 10, p. 189 (1758) (« Habitat in Europa »; we fix Sweden as type locality : ex Fauna Suec. no. 239).

Fig. New edition of Naumann's Vög. Mitteleur. Vol. 2, pl. 19, f. 1.

Hab. Scandinavia, Northern and Western Russia (Baltic Provinces, Poland), East Prussia.

75. **Parus cristatus mitratus** Brehm.

Parus mitratus Brehm, Handb. Naturg. Vög. Deutschl. p. 467 (1831) (« bewohnt die deutschen Schwarzwälder »).

Parus rufescens (nec Townsend 1837) Brehm, Vogelfang, p. 243 (1855) (« Mittelddeutschland »).

Lophophanes cristatus brunescens Prazák, Journ. f. Ornith. Vol. 45, p. 347 (1897) (new name for *P. rufescens* Brehm : « West Europe »).

Fig. New edition of Naumann's Vög. Mitteleur. Vol. 2, pl. 19, f. 2, pl. 20, f. 1.

Hab. Central and western parts of Germany, Jutland, Holland, France, Switzerland, Austria, Hungary, Spain, Balkan Peninsula.

76. **Parus cristatus scoticus** (Prazák).

Lophophanes cristatus scotica Prazák, Journ. f. Ornith. Vol. 45, p. 347 (1897) (Scotland).

Hab. Very locally distributed in Scotland, breeding particularly in the Strathspey.

Obs. This is a well-marked form, easily recognizable by its much darker, brownish olive back and smaller size (wing 60-63 mm.).

77. **Parus dichrous dichrous** Hodgson.

Parus dichrous Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 58.

Hab. Himalaya from Dharmasala to Sikkim, at elevations of from 7500 to 12,000 feet.

78. **Parus dichrous dichroides** (Przewalski).

Lophophanes dichroides Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 189 (1877) (Kansu, N. W. China).

Fig. Aves Przewalsk. pl. 9, f. 2.

Hab. Western and N. W. China (Kansu, Mupin, Tetung Mountains), in coniferous forests of the subalpine region.

79. **Parus wollweberi wollweberi** (Bonaparte).

Lophophanes wollweberi Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 31, p. 478 (1850) (Zacatecas, Mexico).

Lophophanes galeatus (Lichtenstein MS.) Cabanis, Mus. Heinean. Vol. 1, p. 90, footnote (1850) (Mexico).

Hab. Highlands of Mexico, in the States of Oaxaca, Puebla, Vera Cruz (Orizaba) and northwards to Zacatecas.

80. **Parus wollweberi annexus** Cassin.

Parus annexus Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 5, p. 103, pl. 1 (1850) (« Rio Grande, Texas », locality erroneous, cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 394, footnote).

Hab. Mountains of Arizona, New Mexico, Sonora and Chihuahua.

81. *Parus bicolor* Linnæus 1).

Parus bicolor Linnæus, Syst. Nat., ed. 12, Vol. 1, p. 340 (1766) (ex Catesby, Crested Titmouse. Nat. Hist. Carolina, Vol. 1, pl. 57 : Carolina).

Lophophanes missouriensis Baird, Rep. Pacific R. R. Surv. Vol. 9, p. 384, in text (1858) (Fort Leavenworth, Kansas).

Parus (*Lophophanes*) *bicolor floridanus* Bangs, Auk, Vol. 15, p. 181 (1898) (Clear Water, Hillsboro Co., Florida).

Fig. Audubon, Ornith. Biogr. Vol. 1, 1831, pl. 39.

Hab. Eastern United States, north to southern Pennsylvania and New Jersey, Central Ohio, northern Indiana, northern Illinois, southern Iowa, and N. E. Nebraska; west to eastern portion of the Great Plains (Nebraska to Texas); south to Gulf coast, including southern Florida as well as eastern and central parts of Texas.

82. *Parus atricristatus atricristatus* Cassin 1).

Parus atricristatus Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 5, p. 103, pl. 2 (1850) (Rio Grande, Texas).

Hab. Rio Grande Valley, and Mexican States of Coahuila, Nuevo Leon, Tamaulipas, San Luiz Potosi and Vera Cruz.

83. *Parus atricristatus sennetti* (Ridgway).

Baeolophus atricristatus sennetti Ridgway, Birds North- and Middle America [= Bull. U. S. Nat. Mus. no. 50, Pt. 3], Vol. 3, p. 386 (1904) (Leon Springs, Bexar Co., Texas).

Fig. Cassin, Illustr. Birds Calif. 1853, pl. 3.

Hab. Central Texas, exact southern limits not yet known.

84. *Parus inornatus inornatus* Gambel.

Parus inornatus Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 265 (1845) (near Monterey, California).

Baeolophus inornatus restrictus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Oakland, California); = *B. i. inornatus*; J. Grinnell, Auk, Vol. 23, 1906, pp. 186-188.

Fig. Journ. Acad. Nat. Sc. Philad. (2). Vol. 1, 1847, pl. 8, f. 2.

Hab. California : north of San Bernardino Mountains and Colorado Desert; north to Mendocino and Siskiyou; south to Santa Barbara, Ventura and Kern; east to western slope of Sierra Nevada.

85. *Parus inornatus murinus* (Ridgway).

Baeolophus inornatus murinus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Nachoguero Valley, Lower California).

Hab. Southern California (Los Angeles, San Bernardino, San Diego Counties) and Northern Lower California (Nachoguero Valley, San Pedro Martir Mountains etc.).

86. *Parus inornatus ridgwayi* Richmond.

Lophophanes inornatus griseus (nec *Parus griseus* Gmelin 1788) Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 344 (1882) (Iron City, south, Utah).

Parus inornatus ridgwayi Richmond, Proc. Biol. Soc. Wash. Vol. 15, p. 155 (1902) (new name for *L. i. griseus* Ridgway).

Hab. Mountains of the arid interior Districts of western United States; north to Nevada, Utah and Colorado; east to western Texas (Guadalupe Mts.); west to eastern base of Sierra Nevada and S. E. California; south to Mexican boundary line in New Mexico and Arizona.

87. *Parus inornatus cineraceus* (Ridgway).

Lophophanes inornatus cineraceus Ridgway, Proc. U. S. Nat. Mus. Vol. 6, p. 154 (1883) (Laguna, Lower California).

Hab. Cape St. Lucas District of Lower California (Sierra de la Laguna, Victoria Mountains).

88. *Parus rubidiventris* Blyth.

Parus rubidiventris Blyth, Journ. Asiat. Soc. Bengal, Vol. 16, 1, p. 445 (1847) («Nepal and Sikkim»).

Fig. Gould, Birds Asia, Vol. 2, pl. 59.

Hab. Nepal.

Obs. This is a very imperfectly known form and may perhaps turn out to be a geographic race of *P. rufonuchalis* or even an immature stage of *P. r. beavani*. It differs from the latter in having the breast and abdomen ferruginous, sometimes mixed with greyish, especially on the flanks. Besides, the head and throat are duller, more of a brownish black.

1) Hybrids between *P. bicolor* and *P. a. atricristatus* have been described under the names : *Parus atricristatus castaneifrons* Sennett (Auk, Vol. 4, 1887, p. 28 : Bee Co., Texas) and *Parus bicolor texensis* Sennett (loc. cit. p. 29 : Bee Co., Texas). The former agrees with *P. a. atricristatus* in having the crown and crest black, but the frontal band is chestnut instead of whitish, while the other form has the crown and crest grey like *P. bicolor*, from which it differs by the forehead being rusty or chestnut instead of black. See Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 386; Allen, Bull. Amer. Mus. New York, Vol. 23, 1907, pp. 467-481.

89. **Parus rufonuchalis rufonuchalis** Blyth.

Parus rufonuchalis Blyth, Journ. Asiat. Soc. Bengal, Vol. 18, II, p. 810 (1849) (« Range beyond Simla, near the snow-line »).

Fig. Gould, Birds Asia, Vol. 2, pl. 60.

Hab. Turkestan, and Himalayas from Gilgit to Ghurwal, in the breeding season at elevations of from 7000 to 12,000 feet.

90. **Parus rufonuchalis beavani** (Jerdon).

Lophophanes Beavani (Blyth MS.) Jerdon, Birds of India, Vol. 2, p. 275 (1863) (Mount Tongloo, Sikkim, at elevations of 10,000 feet).

Parus Atkinsoni Jerdon, ibidem, p. 276 (1863) (« interior of Sikkim, at a considerable elevation »).

Hab. Eastern Himalayas (Nepal, Sikkim) and Western China 1) (Tsinling, South Shen-si, Kansu).

91. **Parus rufonuchalis pœcilopsis** (Sharpe) 2).

Lophophanes pœcilopsis Sharpe, Bull. Brit. Ornith. Club, Vol. 13, p. 11 (1902) (Chü-tung, W. Yunnan).

Hab. S. W. China : W. Yunnan).

92. **Parus melanolophus** Vigors.

Parus melanolophus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 23 (1831) (Himalaya).

Fig. Gould, Birds Asia, Vol. 2, pl. 61.

Hab. Parts of Afghanistan, and western Himalayas (from Kumaon to Gilgit and Murree), at elevations of from 6000 to 12,000 feet.

93. **Parus ater britannicus** Sharpe & Dresser.

Parus britannicus Sharpe & Dresser, Ann. Mag. Nat. Hist. (4), Vol. 8, p. 437 (1871) (England).

Fig. Mem. Proc. Manchester Lit. Philos. Soc. Vol. 50, Pt. 3, no. 13, pl., f. 2.

Hab. England, Scotland.

93a. **Parus ater hibernicus** Ogilvie-Grant.

Parus hibernicus Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 27, p. 37 (1910) (Ireland).

Fig. The Ibis, 1911, pp. 548-552, pl. 10.

Hab. Ireland.

94. **Parus ater vieiræ** Nicholson.

Parus vieiræ Nicholson, Mem. Proc. Manchester Lit. Philos. Soc. Vol. 50, Pt. 3, no. 13, p. 16, pl., f. 1 (1906) (Coimbra, Portugal).

Hab. Portugal, probably also in Spain.

95. **Parus ater atlas** Meade-Waldo.

Parus atlas Meade-Waldo, Bull. Brit. Ornith. Club, Vol. 12, p. 27 (1901) (Atlas Mountains, Morocco).

Fig. The Ibis, 1903, pl. 6.

Hab. Morocco : Atlas Mountains, at elevations of 6000 feet and more.

96. **Parus ater ledouci** Malherbe. (Pl. 1, Fig. 5.)

Parus ledouci Malherbe, Bull. Soc. Moselle, Vol. 3, p. 57 (1845) (Algeria).

Fig. The Ibis, 1871, pl. 3; Dresser, Birds Europe, Vol. 3, pl. 107.

Hab. North Algeria and North Tunisia.

97. **Parus ater sardus** Kleinschmidt.

Parus sardus Kleinschmidt, Ornith. Monatsber. Vol. 11, p. 186 (1903) (Sardinia).

Hab. Sardinia and Corsica.

98. **Parus ater ater** Linnæus.

Parus ater Linnæus, Syst. Nat., ed. 10, p. 190 (1758) (« Habitat in Europa »; we fix Sweden as type locality).

Parus carbonarius Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 556 (1827) (new name for *P. ater* of Linnæus).

1) I have not seen specimens from any Chinese locality.

2) Unknown to the author.

Parus abietum Brehm, Handb. Naturg. Vög. Deutschl. p. 466 (1831) (« bewohnt die gebirgigen deutschen Schwarzwälder »).

Parus ater schwederi Loudon & Tschusi, Ornith. Jahrb. Vol. 16, p. 140 (1905) (Livland).

Hab. Europe, from 64° n. lat. south to Italy, the Balcan States, Asia Minor, and east to West and Central Siberia.

Obs. As a rule, specimens from Scandinavia, East Prussia and Russia (Livland) are purer bluish grey on the back and have the flanks rather pale. If the form from Central- and S. E. Europe should prove to be separable the name *P. a. abietum* would become available for it.

99. ***Parus ater amurensis*** (Buturlin).

Periparus ater amurensis Buturlin, Ornith. Monatsber. Vol. 15, p. 80 (1907) (Amoor, Ussuri, Sakhalin etc.).

Hab. Eastern Siberia : Amoorland, Ussuri, Sakhalin and the shores of the Okhotsk Sea.

100. ***Parus ater insularis*** Hellmayr.

Parus ater insularis Hellmayr, Ornith. Jahrb. Vol. 13, p. 36 (1902) (Japan, type from Suruga, Hondo).

Hab. Japan (Yezo, Hondo).

101. ***Parus ater pekinensis*** A. David.

Parus pekinensis A. David, The Ibis (new series), Vol. 6, p. 155 (1870) (Pekin, China).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, 1872, Bull. pl. 5, f. 1; David & Oustalet, Ois. Chine, pl. 34.

Hab. China (from Pekin to Fohkien), Manchooria, Corea (Chemulpo).

102. ***Parus ater rufipectus*** Severtzow.

Parus ater var. *rufipectus* (*asiatica*) Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 134 (1873) (Turkestan; Russian!); Dresser, The Ibis, 1876, p. 93 (transl.).

Parus piceae Severtzow, Stray Feath. Vol. 3, p. 423 (1875) (Turkestan).

Fig. Aves Przewalsk. pl. 9, f. 1.

Hab. Turkestan : Tian-shan Mountains, at elevations of from 8000 to 10,000 feet.

103. ***Parus ater æmodius*** Hodgson.

Parus æmodius Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Lophophanes Humei W. E. Brooks, ibidem, Vol. 42, II, p. 57 (1873) (Sikkim).

Hab. Eastern Himalayas (Sikkim, Nepal), eastwards into Western China (Kansu, Shensi).

104. ***Parus ater phæonotus*** Blanford.

Parus phæonotus Blanford, The Ibis (3), Vol. 3, p. 88 (1873) (« in quercetis haud procul ab urbe persica Shiraz »).

Fig. Blanford, Eastern Persia, Vol. 2, Zool. pl. 16, f. 1.

Hab. Oak-woods of Persia (Shiraz etc.), and southern Transcaspia (Ashabad, Shirwan etc.).

105. ***Parus ater michalowskii*** Bogdanow.

Parus Michalowskii Bogdanow, Trudui Kazan. Univ. Vol. 8, IV, p. 87 (1879) (Suram Pass and Kirshaweli in Western Caucasus; Russian!); Schalow, Journ. f. Ornith. 1880, p. 268 (transl.).

Hab. Southern Caucasus (Kura valley, from Suram and Sekarsk to Kedabeg, Tiflis and Lenkoran).

Obs. One specimen from the Laba valley (Mt. Kuba), North Caucasus, differs by having the back much less brownish, greyish olive, and the brownish wash on the flanks paler and more restricted. In coloration, it is practically identical with *P. a. derjugini*, but has a much shorter, stouter bill.

106. ***Parus ater derjugini*** (Sarudny & Loudon).

« *Periparus ater* Linnæus var. *derjugini* » Sarudny & Loudon, Ornith. Monatsber. Vol. 11, p. 129 (1903) (« Tschorochgebiet » in N. W. Caucasus).

Hab. Lasistan in Northern Armenia, and Dshoroch-district, Transcaucas'ia.

107. ***Parus ater moltchanovi*** Menzbier.

Parus moltchanovi Menzbier, Bull. Brit. Ornith. Club, Vol. 13, p. 49 (1903) (« in sylvis montium Yaila peninsulæ Tauricæ »).

Hab. Mountains of Southern Crimea.

108. ***Parus ater cypriotes*** Dresser. (Pl. 1, Fig. 4.)

Parus cypriotes Dresser, Proc. Zool. Soc. Lond. 1887, p. 563 (1888) (Cyprus).

Fig. Dresser, Birds Europe, Vol. 9, pl. 658.

Hab. Cyprus.

109. **Parus amabilis** Sharpe.

Parus amabilis Sharpe, Trans. Linn. Soc. Lond. (2), Vol. 1, p. 338, pl. 53, f. 2 (1877) (Island of Balabac, Philippines).
Hab. Philippine Islands : Balabac, Palawan.

110. **Parus elegans elegans** Lesson.

Parus elegans Lesson, Traité d'Ornith. p. 456 (1831) (no locality; the type is from the Philippines; cfr. Pucheran, Rev. Mag. Zool. (2), Vol. 6, 1854, p. 68).
Parus quadrivittatus Lafresnaye, Rev. Zool. Vol. 3, p. 129 (1840) (« in Manilla aut in India »).
Fig. Gould, Birds Asia, Vol. 2, pl. 50.
Hab. Philippine Islands : Luzon, Mindoro, Negros, Panay, Guimaras, Cebu, Bongao I).

111. **Parus elegans albescens** (McGregor).

Pardaliparus albescens McGregor, Philipp. Journ. Sc. Vol. 2, p. 293 (1907) (Ticao Island).
Hab. Philippine Islands : Masbate, Ticao.

112. **Parus elegans edithæ** (McGregor).

Pardaliparus edithæ McGregor, Philipp. Journ. Sc. Vol. 2, p. 294 (1907) (Calayan Island, Babuyan Group).
Hab. Northern Philippine Islands : Calayan Isl., Babuyan Group.

113. **Parus elegans mindanensis** (Mearns).

Pardaliparus elegans mindanensis Mearns, Proc. Biol. Soc. Wash. Vol. 18, p. 8 (1905) (Mount Apo, Mindanao).
Hab. Philippine Islands : Mountains of Mindanao.

114. **Parus venustulus** Swinhoe.

Parus venustulus Swinhoe, Proc. Zool. Soc. Lond. 1870, p. 133 (1870) (« from Kweifoo in Szechuen to Ichang in Hoopih »).
Pardaliparus potaninae Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 247 (1902) (based on *P. venustulus* Berezowski & Bianchi, Av. Exped. Potanini, p. 108, pl. 2, f. 3 : S. W. Kansu).
Fig. Gould, Birds Asia, Vol. 2, t. 48; Blackwelder, Research in China, Vol. 1, II, 1907, pl. 62.
Hab. Mountains of China, from Kansu and Shensi (Tsinling) south to Szechuen, Hoopih and N. W. Fohkien.

115. **Parus superciliosus** (Przewalski). (Pl. 1, Fig. 10.)

Pacile superciliosa Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 189 (1877) (Alpine region of the mountains of Kansu).
Fig. Aves Przewalsk. p. 160, t. 8, ff. 3, 4.
Hab. Alpine region of Western China : Kansu, upper Chuanche, Southern Kookoonor-Range.

116. **Parus gambeli gambeli** Ridgway.

Parus montanus (nec Baldenstein 1827) Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 1, p. 259 (1843) (Santa Fé, New Mexico).
Parus gambeli Ridgway, in Amer. Ornith. Union's Check-List, p. 335 (1886) (nom. emend.).
Parus gambeli thayeri Birtwell, Auk, Vol. 18, p. 166 (1901) (Near Albuquerque, New Mexico).
Fig. Journ. Acad. Nat. Sc. Philad. (2), Vol. 1, t. 8, f. 1.
Hab. Mountains of western United States, from the Rocky Mountains to the Coast ranges; north to British Columbia, south to Western Texas, New Mexico and Arizona and Northern California.

117. **Parus gambeli baileyæ** (J. Grinnell).

Penthestes gambeli baileyæ J. Grinnell, Condor, Vol. 10, p. 29 (1908) (Sierra San Gabriel, Los Angeles County, California).
Hab. Mountains of Southern California (Sierra San Gabriel, San Bernardino Mountains); North. Lower California?

118. **Parus sclateri** Kleinschmidt.

Parus meridionalis (nec Lilljeborg 1852) Sclater, Proc. Zool. Soc. Lond. Vol. 24, 1856, p. 293 (Jan. 1857) (El Jacale, S. Mexico).

1) It is yet to be determined to which race the birds found on the Sulu and Tawi Tawi Islands are referable. Possibly they constitute an undescribed form.

Parus sclateri Kleinschmidt, Journ. f. Ornith. Vol. 45, p. 133, in text (1897) (nom. emend.).

Hab. Highlands of Mexico from States of Oaxaca, Vera Cruz and Puebla north to S. Arizona (Chiricahua Mountains).

119. **Parus hypermelænus hypermelænus** (Berezowski & Bianchi).

Poecile hypermelaena Berezowski & Bianchi, Av. Exped. Potanini, p. 112, t. 2, f. 2 (1891) (Shen-si, near the frontier of Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 72 (transl.).

Hab. N. W. China : Lan-tsha-kou in Shensi, near the frontier of Kansu.

120. **Parus hypermelænus dejeani** Oustalet.

Parus dejeani Oustalet, Bull. Mus. Hist. Nat. Paris, Vol. 3, p. 209 (1897) (Ta-tsien-lu, Szechuen).

Hab. W. China : Szechuen.

121. **Parus davidi** (Berezowski & Bianchi).

Poecile Davidi Berezowski & Bianchi, Av. Exped. Potanini, p. 113, t. 2, f. 3 (1891) (South Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 73 (transl.).

Hab. North- and Western China : Szechuen, Kansu, Shensi (Tsinling Mts.).

122. **Parus palustris palustris** Linnæus.

Parus palustris Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa»; we fix *Sweden* as *terra typica*; cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 370).

Parus meridionalis Lilljeborg, Naumannia, Vol. 2, 11, p. 100 (1852) (based on Nilsson and Selys).

Parus fruticeti Wallengren, Naumannia, Vol. 4, p. 141 (1854) («im südlichen und mittleren Schweden gemein»).

Poecila palustris vera L. Brehm, Naumannia, Vol. 6, p. 368 (1856) (part. : «in der hiesigen Gegend [errore!] und in Schweden, namentlich bei Stockholm»).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 4, fig. sup. New edit. of «Naumann», Vol. 2, pl. 21, f. 5.

Hab. Southern- and central portions of Scandinavia, Russian Baltic Provinces and East Prussia.

123. **Parus palustris communis** Baldenstein. (Pl. 1, Fig 9.)

Parus cinereus communis Baldenstein, Neue Alpina, Vol. 2, p. 31 (1827) («überall in unseren Tälern... selten bis in die Mittelberge hinauf», *terra typica* : Graubünden, Switzerland).

Parus subpalustris Brehm, Vogelfang, p. 242 (1855) («Deutschland», *typ. loc.* : Renthendorf).

Poecila palustris sordida Brehm, Naumannia, Vol. 6, p. 369 (1856) («Mitteldeutschland», *typ. loc.* : Renthendorf).

Fig. New edit. of «Naumann», Vol. 2, pl. 20, f. 4

Hab. Germany (except western- and eastern parts), Switzerland, Austria and S. W. Hungary (Baranya).

124. **Parus palustris longirostris** Kleinschmidt.

Parus dresseri longirostris Kleinschmidt, Ornith. Jahrb. Vol. 8, p. 65 (1897) («Frankreich und Rheingegend».

Terra typica : Latour, France; cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, p. 373).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 3, fig. sup.

Hab. Rhine-province, France, Holland and Belgium.

125. **Parus palustris dresseri** Stejneger.

Parus palustris dresseri Stejneger, Proc. U. S. Nat. Mus. Vol. 9, 1886, p. 200 (1887) (Great Britain).

Fig. New edit. of Naumann's Vög. Mitteleur. Vol. 2, pl. 21, f. 4.

Hab. England and southern parts of Scotland.

126. **Parus palustris italicus** Tschusi & Hellmayr.

Parus communis italicus Tschusi & Hellmayr, Ornith. Jahrb. Vol. 11, p. 204 (1900) (Siena, Tuscany).

Parus communis tschusii Hellmayr, Ornith. Jahrb. Vol. 12, p. 110 (1901) (Cremona, N. Italy).

Hab. Italy; also in Sicily and Sardinia (breeding?)

127. **Parus palustris stagnatilis** Brehm.

Parus stagnatilis Brehm, Vogelfang, p. 242 (1855) («Galizien»).

Hab. Galizia, Hungary, Balkan Peninsula, South Russia and Caucasus; Asia Minor?

128. **Parus palustris korejewi** Sarudny & Härms.

Parus communis korejewi Sarudny & Härms, Ornith. Monatsber. Vol. 10, p. 54 (1902) (Karatau, Turkestan).

Hab. Turkestan : Karatau.

129. ***Parus palustris hellmayri*** Bianchi.

Parus palustris hellmayri Bianchi, Ann. Mus. Zool. St-Petersb. Vol. 7, p. 236 (1902) (based on «*Parus* sp. nov.» Kleinschmidt, Ornith. Jahrb. Vol. 8, 1897, p. 77 : Pekin, China).

Hab. North China : Pekin.

130. ***Parus palustris brevirostris*** (Taczanowski).

Poicilia brevirostris Taczanowski, Journ. f. Ornith. Vol. 20, p. 444 (1872) (South Baicalia).

Hab. Central Siberia (Krasnoyarsk to Irkutsk, Lake Baical, Altai etc.).

131. ***Parus palustris crassirostris*** (Taczanowski).

Poicilia palustris crassirostris Taczanowski, Bull. Soc. Zool. Fr. Vol. 10, p. 470 (1885) (Sidemi River, East Siberia).

Hab. S. E. Siberia : Ussuriland ; Corea ?.

132. ***Parus palustris hensoni*** Stejneger.

Parus hensoni Stejneger, Proc. U. S. Nat. Mus. Vol. 15, p. 342 (1892) (Hakodate, Yezo).

Parus seebohmii Stejneger, ibidem, p. 343 (1892) (Sapporo, Yezo).

Hab. North Japan : Yezo and Iterup, Kuril Isl.

133. ***Parus atricapillus atricapillus*** Linnæus.

Parus atricapillus Linnæus, Syst. Nat., ed. 12, Vol. 1, p. 341 (1766) (based on Brisson, «*Parus canadensis atricapillus* », Ornith. Vol. 3, p. 553 : Canada).

Parus melanocephalus Brehm, Vogelfang, p. 242 (1855) (Nordamerika).

Fig. Audubon, Ornith. Biogr. Vol. 4, 1838, p. 374, pl. 353, f. 3.

Hab. North-eastern United States and south-eastern British Provinces, north to New Foundland, southern Labrador, south to about 40° lat. A separate colony inhabits the area between the Rocky Mountains and Cascade Range, in eastern Washington, western Idaho and central British Columbia (cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 398).

134. ***Parus atricapillus septentrionalis*** Harris.

Parus septentrionalis Harris, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 300 (Dec. 1845) (near mouth of Yellowstone River, western North Dakota).

Parus albescens Baird, Rep. Pacific R. R. Survey, Vol. 9, p. xxxvii (1858) (Rocky Mountains; nomen nudum, but characters given, without name, on p. 389, in text).

Hab. Great Plains and Rocky Mountain districts of central North America, from New Mexico and Kansas to Alaska (Kenai), east to eastern Kansas, Iowa, S. Dakota, W. Minnesota, Manitoba etc.).

135. ***Parus atricapillus turneri*** Ridgway.

Parus atricapillus turneri Ridgway, Proc. Biol. Soc. Wash. Vol. 2, p. 89 (1884) (St. Michael, Alaska).

Hab. Alaska, west and north of Cook Inlet.

136. ***Parus atricapillus occidentalis*** Baird.

Parus occidentalis Baird, Rep. Pacific R. R. Survey, Vol. 9, p. 391 (1858) (Shoal-water Bay, Washington).

Hab. North-west Coast of North America : from the Columbia River to British Columbia.

137. ***Parus atricapillus carolinensis*** Audubon.

Parus carolinensis Audubon, Ornith. Biogr. Vol. 2, p. 341, pl. 160 (1834) (near Charleston, South Carolina).

Hab. Eastern United States (south of 40° latitude), south to northern- and western Florida and golf coast westward to Louisiana.

138. ***Parus atricapillus agilis*** Sennett.

Parus carolinensis agilis Sennett, Auk, Vol. 5, p. 46 (1888) (Bee Co., Texas).

Hab. Eastern and central Texas, Indian Territory and Oklahoma.

139. ***Parus atricapillus impiger*** Bangs.

Parus carolinensis impiger Bangs, Proc. New Engl. Zool. Club, Vol. 4, p. 1 (1903) (Deep Creek, near Lake Ashby, East Florida).

Hab. Eastern Florida.

140. ***Parus atricapillus kamtschatkensis*** (Bonaparte).

Poecila kamtschatkensis Bonaparte, Consp. Gen. Avium, Vol. 1, p. 230 (1850) («*Parus palustris*, ex Kamtschatka, Mus. Lugd. »).

Parus wiemuthi Dybowski MS. fide Stejneger, Bull. U. S. Nat. Mus. Vol. 29. 1885, p. 297.

Fig. Zeitschr. ges. Ornith. Vol. 1, t. 7.

Hab. Kamtschatka.

141. ***Parus atricapillus restrictus*** Hellmayr.

Parus borealis restrictus Hellmayr, Ornith. Jahrb. Vol. 11, p. 215 (1900) (Hondo).

Hab. South Japan : Island of Hondo.

142. ***Parus atricapillus sachalinensis*** Lönnerberg.

Parus atricapillus sachalinensis Lönnerberg, Journ. Sc. Coll. Tokio, Vol. 23, art. 14, p. 20 (1908) (Saghalin).

Hab. Island of Sakhalin.

143. ***Parus atricapillus baicalensis*** (Swinhoe).

Poecile baicalensis Swinhoe, Ann. Mag. Nat. Hist. (4), Vol. 7, p. 257 (1871) (« Transbaikal », the type in the Brit. Mus., examined by me, is from Kultuk, on Lake Baical).

Poecilia palustris macroura Taczanowski, Mém. Acad. Sc. St.-Petersb. (7), Vol. 39, p. 436 (1891) (Gouv. Irkutsk and Dauria).

Poecile tunkanensis Madarász, Ann. Mus. Nat. Hung. Vol. 7, p. 177 (1909) (Tunkan Mts., west of Lake Baical).

Hab. From N. E. Russia through Siberia to the shores of the Sea of Okhotsk, Manchouria and the island of Yezo, Japan.

144. ***Parus atricapillus borealis*** Selys-Longchamps.

Parus borealis Selys-Longchamps, Bull. Acad. Roy. Bruxelles, Vol. 10, II, p. 28 (1843) (Iceland, errore! We fix Sweden as type locality).

Parus colletti Stejneger, Proc. U. S. Nat. Mus. Vol. 11, p. 74 (1888) (Bergen, West Norway).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 4, fig. inf.; New edit. of « Naumann », Vol. 2, pl. 21, f. 3.

Hab. Scandinavia, North-west Russia, Baltic Provinces and East Prussia.

145. ***Parus atricapillus bianchii*** (Sarudny & Härms).

Poecile salicaria neglecta (nec *Parus rufescens neglectus* Ridgway 1879) Sarudny & Härms, Ornith. Monatsber. Vol. 8, p. 19 (1900) (Pleskau, W. Russia).

Poecile salicaria bianchii Sarudny & Härms, ibidem, p. 67 (1900) (nom. emend.).

Hab. Only known from Pskow in W. Russia. Breeding places unknown, perhaps in the Waldai Mts.

146. ***Parus atricapillus assimilis*** Brehm.

Parus assimilis Brehm, Vogelfang, p. 242 (1855) (« Galizien »).

Hab. South-eastern Europe (Carpathian Mountains, Transsylvania, Hungary, Bosnia, Serbia and Bulgaria).

147. ***Parus atricapillus montanus*** Baldenstein. (Pl. 1, Fig. 8.)

Parus cinereus montanus Baldenstein, Neue Alpina, Vol. 2, p. 31 (1827) (Mountain Forests of Graubünden, Switzerland).

Parus alpestris Bailly, Bull. Soc. Hist. Nat. Savoie, 1852, p. 22 (1852) (Savoy).

Poecila salicaria alpina Brehm, Naumannia, Vol. 6, p. 370 (1856) (« auf den Alpen der Schweiz »).

Parus Baldensteinii Salis, Jahresber. Naturf. Ges. Graubündens, Vol. 6, p. 107 (1861) (« In Nadelwäldern von 4000 bis 7000 Fuss in Graubünden, z. B. St. Moritz im Engadin »).

Fig. New edition of Naumann's Vög. Mitteleuropas, Vol. 2, pl. 21, f. 2.

Hab. Forests of the Alps from Styria and Carinthia westwards to Savoy, Basses-Alpes etc. at elevations of from 3000 to 7000 feet.

148. ***Parus atricapillus salicarius*** Brehm.

Parus salicarius Brehm, Handb. Naturg. Vög. Deutschl. p. 465 (1831) (« Lebt in unseren Tälern, besonders an den mit Weiden besetzten Bach-, Fluss- und Teichufern »; type locality : Renthendorf).

Parus accedans Brehm, Vogelfang, p. 242 (1855) (« Deutschland »; type locality : Renthendorf).

Parus murinus Brehm, Vogelfang, p. 242 (1855) (« Deutschland »; type locality : Renthendorf).

Poecila salicaria vera Brehm, Naumannia, Vol. 6, p. 370 (1856) (« in den hiesigen Tälern », i. e. Renthendorf).

Parus musicus Homeyer (ex Brehm in litt.) Ornith. Briefe, p. 76 (1881) (« lebt und brütet im Nadelwald »; type locality : Renthendorf).

Parus salicarius communis Olphe-Galliard (ex Brehm in litt.), Ornith. Jahrb. Vol. 3, p. 146 (1892) (« Deutschland »; type locality : Renthendorf).

Hab. Parts of Germany (Mecklenburg, Silesia, Thuringia, Bavaria) and Austria, in the lowlands and hill districts up to about 3000 feet.

149. ***Parus atricapillus rhenanus* Kleinschmidt.**

Parus rhenanus Kleinschmidt, Ornith. Monatsber. Vol. 8, p. 168 (1900) (Banks of the Rhine between Mayence and Bingen).

Fig. Journ. f. Ornith. Vol. 45, 1897, pl. 3; New edition of « Naumann », Vol. 2, pl. 21, f. 1.

Hab. Known to inhabit the valley of the Rhine, from Worms down to Wesel, and widely distributed in Holland. Probably also occurring in Belgium and France.

150. ***Parus atricapillus kleinschmidtii* Hellmayr 1).**

Parus montanus kleinschmidtii Hellmayr, Ornith. Jahrb. Vol. 11, p. 212 (1900) (England, the type is from Coalfall Wood, Finchley, near London).

Hab. England, Scotland.

151. ***Parus songarus songarus* Severtzow.**

Parus songarus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 134 (1873) (Tian-shan, Turkestan); Dresser, The Ibis (3), Vol. 6, 1876, p. 93 (transl.).

Fig. Aves Przewalsk. pl. 8, f. 1.

Hab. Northern Turkestan (Ssairam-Noor, Tian-shan, Kara-tau, Dsharkent, Musart Range etc.).

152. ***Parus songarus affinis* (Przewalski).**

Poecile affinis Przewalski, in Rowley's Ornith. Miscell. Vol. 2, p. 188 (1877) (Alashan and Kansu).

Fig. Aves Przewalsk. pl. 8, f. 2.

Hab. North-eastern Tibet, Kansu, southern Mongolia.

153. ***Parus lugubris lugubris* Temminck.**

Parus lugubris (Natterer MS.) Temminck, Man. d'Ornith., ed. 2, Vol. 1, p. 293 (1820) (Dalmatia and Hungary).

Fig. Nauman's Vög. Deutschl. Vol. 13, II, pl. 379, f. 1; Reiser, Ornith. Balc. Vol. 3, 1905, pl. 1, f. 1.

Hab. Southern Hungary (near Mehadia, in Transsylvania etc.), Istria, Dalmatia, Montenegro, Bosnia, Hercegovina, Serbia and Bulgaria.

154. ***Parus lugubris lugens* Brehm.**

Parus lugens Brehm, Vogelfang, p. 243 (1855) (Greece).

Parus lugubris graecus Reiser, Ornith. Jahrb. Vol. 12, p. 216 (1901) (Ætolikon, Greece).

Fig. Reiser, Ornith. Balc. Vol. 3, 1905, pl. 1, f. 2.

Hab. Greece. (Specimens from Turkey which may belong here I have not seen.)

155. ***Parus lugubris hyrcanus* (Sarudny & Loudon).**

Poecile lugubris hyrcanus Sarudny & Loudon, Ornith. Monatsber. Vol. 13, p. 76 (1905) (Rustum Abad, prov. Ghi'an, North Persia).

Hab. North Persia : Elburz Mountains in the provinces of Ghilan and Mazanderán, south of the Caspian Sea.

156. ***Parus lugubris dubius* Hellmayr.**

Poecile lugubris persica (nec *Parus persicus* Blanford, 1873) Prazák, Ornith. Jahrb. Vol. 6, p. 81 (1895) (ex Blanford, East Persia, Vol. 2, Zool. p. 229 : Oak-forest near Shiráz).

Parus lugubris dubius Hellmayr, Journ. f. Ornith. Vol. 49, p. 173 (1901) (Persia).

Hab. Oak-forests of South Persia (Shiráz, Fars). — (Specimens from Palestine [Libanon] are said to belong to the same form.)

1) *Parus brandtii* (Bogdanow).

Poecile brandtii Bogdanow, Trudui Kazan. Univ. Vol. 8, IV, p. 89 (1879) (Borshom, Caucasus); Schalow, Journ. f. Ornith. Vol. 28, 1880, p. 269 (transl.); cfr. Hartert, Vög. paläarkt. Fauna, Lief. 3, 1905, p. 369.

Doubtful species, perhaps a geographical form of *P. atricapillus*.

157. *Parus lugubris anatoliæ* Hartert.

Parus lugubris anatoliæ Hartert, Vög. Paläarkt. Fauna, Lief. 3, p. 368 (1905) (Ahoory, Asia Minor).

Hab. Mountains of Asia Minor.

158. *Parus cinctus cinctus* Boddaert.

Parus cinctus Boddaert, Tabl. Pl. Enl. p. 44 (1783) (ex Daubenton, Pl. Enl. 708, Buffon & Brisson : Siberia).

Parus sibiricus Gmelin, Syst. Nat. Vol. 1, II, p. 1013 (1789) (ex Daubenton etc., Siberia).

Parus lapponicus Lundahl, Notiser Sällsk. Fauna Fenn. Vol. 1, p. 4, pl. 1, f. 1 (1848) (Lapland).

Parus septentrionalis (nec Harris 1845!) Brehm, Vogelfang, p. 243 (1855) (Russia).

Poecila sibirica vera Brehm, Naumannia, Vol. 6, p. 369 (1856) (« Verirrt sich aus dem Asiatischen Russland nach Europa, kommt aber auch in Norwegen vor »).

Poecila sibirica microrhynchus Brehm, ibidem, p. 369 (new name for *P. septentrionalis* Brehm).

Parus melanothorax (Brehm in litt.) Olphe-Galliard, Ornith. Jahrb. Vol. 3, p. 137 (1892) (Norway).

Fig. Dresser, Birds Europe, Vol. 3, pl. 112.

Hab. Northern parts of Scandinavia, Lapland, North Russia and northern Siberia (eastwards to the Jenissey).

159. *Parus cinctus sayanus* (Sushkin).

Poecile cincta sayana Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 44 (1904) (« Sayan occidentalis, Altai »).

Hab. Eastern Sayan-Range, Altai Mountains.

160. *Parus cinctus obtectus* Cabanis.

Parus (Poecile) obtectus Cabanis, Journ. f. Ornith. Vol. 19, p. 237 (1871) (south of Lake Baikal, Siberia).

Parus grisescens Sharpe & Dresser Birds Europe, Vol. 3, p. 129 (1871) (south shores of Lake Baikal).

Hab. Siberia, from Tomsk (?), the Jenissey River (Krasnoyarsk) and the countries round Lake Baikal, east to Amoorland. Exact eastern limits not known.

161. *Parus cinctus kolymensis* (Buturlin).

Poecile kolymensis Buturlin, Journ. f. Ornith. Vol. 56, p. 284 (1908) (Kolyma R., N. E. Siberia).

Hab. N. E. Siberia, from the Kolyma River south to the shores of the Okhotsk Sea.

162. *Parus cinctus alascensis* (Prazák).

Poecile cincta alascensis Prazák, Ornith. Jahrb. Vol. 6, p. 92 (1895) (Alaska); cfr. Ridgway, Birds North- and Middle America, Vol. 3, 1904, p. 411.

Hab. Northern Alaska (St. Michael, valley of Kowak River etc.) and eastwards to northern Mackenzie (Fort Anderson).

163. *Parus hudsonicus hudsonicus* Forster.

Parus Hudsonicus J. R. Forster, Philos. Trans. Vol. 62, pp. 408, 430 (1772) (Severn R., Hudson Bay).

Parus hudsonicus evura Coues, Key N. Americ. Birds, ed. 2, p. 267 (1884) (Alaska).

Parus hudsonicus ungava Rhoads, Auk, Vol. 10, p. 328 (1893) (Fort Chimo, Ungava).

Parus stoneyi Ridgway, Man. N. Amer. Birds, p. 591 (1887) (Kowak R., N. W. Alaska).

Hab. From shores of Hudson Bay (including Ungava district) north-westward to Alaska (north and west of Cook Inlet) as far as valley of Kowak River.

164. *Parus hudsonicus columbianus* Rhoads.

Parus hudsonicus columbianus Rhoads, Auk, Vol. 10, p. 23 (1893) (Field, British Columbia).

Hab. Rocky Mountain district, from interior of British Columbia, north. Montana and Alberta to Kenai Peninsula, Alaska.

165. *Parus hudsonicus littoralis* Bryant.

Parus hudsonicus var. *littoralis* Bryant, Proc. Boston Soc. Nat. Hist. Vol. 9, p. 368 (1865) (Yarmouth, Nova Scotia).

Hab. South-eastern British Provinces (south. Labrador, Quebec, New Brunswick, Nova Scotia) and extreme north-eastern United States (Maine, New Hampshire, Vermont, N. E. New York).

166. *Parus rufescens rufescens* Townsend 1).

Parus rufescens Townsend, Journ. Acad. Nat. Sc. Philad. Vol. 7, Pt. 2, p. 190 (1837) (Columbia River).

1) J. Grinnell, The Origin and Distribution of the Chestnut-Backed Chickadee; Auk, Vol. 21, 1904, pp. 364-382.

Parus sitchensis Kittlitz, in Lutke's Voy. Le Seniavine, p. 268 in text (1836) (Sitka, Alaska; nom. nud.).

Fig. Audubon, Ornith. Biogr. Vol. 4, 1838, pl. 353.

Hab. Pacific Coast District, from North California to Sitka, Alaska; east to Montana (Great Falls).

167. ***Parus rufescens vivax*** J. Grinnell.

Penthestes rufescens vivax J. Grinnell, Univ. Calif. Publ. Zool. Vol. 5, p. 414 (1910) (Prince William Sound, Alaska).

Hab. Prince William Sound District, Alaska.

168. ***Parus rufescens neglectus*** Ridgway 1).

Parus rufescens β . *neglectus* Ridgway, Proc. U. S. Nat. Mus. Vol. 1, p. 485 (1879) (Nicasio, Marin Co., California).

Hab. Marin County, California.

169. ***Parus rufescens barlowi*** J. Grinnell 1).

Parus rufescens barlowi J. Grinnell, Condor, Vol. 2, p. 127 (1900) (Stevens Creek Canon, Santa Clara Co., California).

Hab. Middle coast district of California, south of San Francisco Bay to past Monterey.

2. GENUS PENTHORNIS HELLMAYR

Penthornis Hellmayr. Journ. f. Ornith. Vol. 49, p. 170 (1901) (sp. typ. : *Melaniparus semilarvatus* Salvadori).

Characters. Bill rather longer than in the members of the genus *Parus*, though not unlike in shape; culmen more abruptly curved in terminal portion, somewhat broadened at base, conspicuously uncinat; gonys nearly straight, at extreme tip only slightly ascending. Nostrils lateral, small, roundish, entirely hidden by the dense antrorse, latero-frontal plumules. Wing longer than in *Parus* and less rounded at tip, when folded, reaching over two-thirds of tail; third, fourth and fifth primaries longest; first primary a little less than half as long as second. Tail nearly square, much shorter than wing. Tarsus robust; acrotarsium covered in front with distinct scutes. Proportion of toes etc. as in *Parus*. Wing 70-80, tail 46-60, tarsus 15-17, bill 8-11 mm.

Coloration. Black and white. Forehead and lores white or buffy white. All the other plumage black, wings and tail duller than the rest. Sexes not much different. In the male the black portions of the plumage are strongly glossed with bluish, while the female is dull blackish brown below. Females and young birds with a more or less distinct whitish nuchal patch, half concealed by the dusky tips of the feathers. Bill black.

Geographical Distribution. Philippine Islands. Two species.

Habits and Nidification unknown.

KEY TO THE SPECIES OF PENTHORNIS

1. *With a white alar speculum. Larger : wing 80, tail 60 mm.* 2. *P. TESSACOURBE.*
 — *No white alar speculum. Smaller : wing 70-74, tail 46-50 mm.* 1. *P. SEMILARVATUS.*

1. ***Penthornis semilarvatus*** (Salvadori). (Pl. 1, Fig. 1.)

Melaniparus semilarvatus Salvadori, Atti Soc. Ital. Sc. Nat. Vol. 8, 1865, p. 375 (1866) (« Himalayas », errore!).

Fig. The Ibis (4), Vol. 3, 1879, pl. 9.

Hab. Philippine Island : Luzon.

1) See footnote on page 37.

2. **Penthornis tessacourbe** (Scopoli).

Muscicapa (Tessacourbe) Scopoli, *Deliciæ Flor. et Faun. Insubr.* Vol. 2, p. 95 (1786) (based on « Le Gobe-mouche noir de l'isle de Luçon », Sonnerat, *Voy. Nouv.-Guinée*, p. 59, pl. 27, f. 2 : Luzon, locality most probably erroneous).

Muscicapa luzoniensis Gmelin, *Syst. Nat.* Vol. 1, II, p. 942 (1789) (based on the same).

Micropus nehrkorni W. Blasius, *Journ. f. Ornith.* Vol. 38, p. 147 (1890) (Mindanao).

Hab. Philippine Island : Mindanao.

3. GENUS **MELANOCHLORA** LESSON

Melanochlora Lesson, *Rev. Zool.* Vol. 2, p. 42 (1839) (sp. typ. : *M. sumatrana* Lesson).

Crataionyx Eyton, *Proc. Zool. Soc. Lond.* Vol. 7, 1839, p. 104 (sp. : *C. flava* Eyton et *C. ater* Eyton).

Crataënyx Agassiz, *Nomencl. Zool., Index*, p. 103 (1846) (nom. emend. pro *Crataionyx* Eyton).

Ptilobaphus Reichenbach, *Avium Syst.* pl. 62 (1850).

Melanichlora A. Dubois, *Syn. Avium*, Vol. 1, p. 460 (1901) (nom. emend. pro *Melanochlora* Lesson).

Characters. Bill rather stout, much shorter than head, about equal in length to inner toe with claw, with outlines decidedly convex, at base somewhat deeper than wide; culmen conspicuously curved; gonys terminally more abruptly ascending than in *Parus*. Nostrils basal, very small, nearly circular, concealed by dense, antrorse latero-frontal plumules. Rictal bristles well-developed. Wing long, rounded; fourth, fifth and sixth primaries nearly equal and longest; third primary equal to seventh, decidedly shorter than fourth to sixth; second equal to ninth; first primary somewhat less than half as long as second; wing-tip about equal to length of tarsus. Tail conspicuously shorter than the wing, slightly graduated; rectrices relatively narrow, with rather pointed tips. Tarsus robust, much longer than middle toe with claw; acrotarsium distinctly scutellate; proportions and adhesion of toes exactly as in *Parus*, but both toes and claws stronger. Feathers of pileum much lengthened, with the barbs dissolved, forming a long, full, erect crest. Wing 100-115, tail 85-90, tarsus 21-24, bill about 16 mm.

Coloration. Sexes different. Forehead, crown, crest and under parts (including under tail coverts) bright yellow in both sexes; nape, back, wings, tail, throat and breast deep black, glossed with bluish green in the male, olive-brown with a slight greenish sheen in the female. The young birds resemble the female, but have a much shorter crest, the upper wing coverts tipped with yellow, and the rectrices edged with whitish.

Observations. Though not unlike *Parus* in general appearance, the stouter bill, much more rounded tail with pointed rectrices, longer tarsus, and the peculiar of the elongated crown-feathers render *Melanochlora* a well-characterized genus among the *Paridae*.

Geographical Distribution. India, Burma, Malakka, Sumatra. *Monotypic*.

Habits and Nidification. We are told by Indian field-ornithologists that this bird frequents the larger trees in small flocks. Nothing appears to be known regarding its nidification.

KEY TO THE SUBSPECIES OF **MELANOCHLORA SULTANEA**

- | | |
|--|---------------------------------------|
| 1. Larger : wing of male 110-115 mm. | 1. <i>M. SULTANEA SULTANEA</i> . |
| — Smaller : wing of male 100-107 mm. | 2. <i>M. SULTANEA FLAVOCRISTATA</i> . |

1. **Melanochlora sultanea sultanea** (Hodgson). (Pl. 2, Figs. 6a, 6b.)

Parus sultaneus Hodgson, Ind. Review, Vol. 1, p. 31 (1837) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 51.

Hab. The lower ranges of the Himalayas from Nepal to head of Assam valley; mountains south of the Bramaputra (Khasia hills, Cachar, Manipur); Burma (from the Kakhyru hills near Bhamo, southward to Pegu, Karennee etc.) and northern Tennasserim. Also recorded from the mountains of N. W. Fohkien, South-eastern China. I have, however, never seen Chinese examples.

2. **Melanochlora sultanea flavocristata** (Lafresnaye).

Parus flavo-cristatus Lafresnaye, Mag. Zool. Cl. 2, pl. 80 (1837) (« Iles de la Sonde »).

Melanochlora Sumatrana Lesson, Rev. Zool. Vol. 2, p. 42 (1839) (Sumatra).

Crataionyx flava Eyton, Proc. Zool. Soc. Lond. Vol. 7, 1839, p. 104 (1839) (« Malaya »; = ♂).

Crataionyx ater Eyton, ibidem, p. 104 (1839) (« Malaya »; = ♀).

Fig. Mag. Zool. 1837, Cl. 2, pl. 80.

Hab. Southern Tennasserim, Malay Peninsula, Sumatra.

4. GENUS APHELOCEPHALA OBERHOLSER

Xerophila (nec F. Held 1837, *Mollusca*) Gould, Proc. Zool. Soc. Lond. Vol. 8, 1840, p. 175 (1841) (type: *X. leucopsis* Gould).

Aphelocephala Oberholser, Proc. Acad. Nat. Sc. Philad. 1899, p. 214 (1899) (nom. emend.).

Characters. Bill rather short, semi-conical, thick, decidedly deeper than wide, culmen strongly curved from base to tip; gonys straight for its basal half, distinctly ascending terminally. Tongue obtuse, without any bristles. Nasal fossæ large, operculate; nostrils very small, nearly circular and almost completely concealed by the antrorse, dense, bristle-like latero-frontal plumules. Rictal bristles strong, well developed, though not very numerous. Wing rather long, rounded; fourth and fifth primaries longest, third and sixth but little shorter; first primary somewhat longer than half the second. Secondaries broad and rather long, their length equal to about four-fifths of the wing. Tail square, much shorter than wing, not more than three-fourths of the latter. Upper tail coverts much developed, covering the basal half of the tail. Tarsus robust, rather more than twice as long as hind toe without claw; acrotarsium distinctly scutellate. Toes slender, outer toe somewhat longer than inner, with claws rather short; hallux stout, with stronger, more decidedly curved claw. Wing 56-60, tail 40-46 mm.

Coloration. Above hair-brown or chestnut (if chestnut, pileum dark brown). Lores and sides of forehead white or buff. Under parts variable, either plain buffish, with more or less ferruginous on flanks (*A. leucopsis* and *A. castaneiventris*), or with a distinct crescent (chestnut in *A. pectoralis*, black in *A. nigricincta*) over the breast. Tail tipped with white. Sexes alike. Plumage soft and lax.

Geographical Distribution. Australia. Five species and subspecies.

Habits. These birds associate in small flocks, frequent gardens, bushes, and low trees, and hop very quickly over the ground, prying among the herbage for their food, which principally consists of the seeds of grasses and small annuals. They are reported to be very tame and to be met with even in the gardens of Adelaide. The nest is of large size, of a domed form, with a hole for an entrance near the top, and is composed of dried grasses, moss, spider's webs, wool, the soft blossoms of plants and dead leaves matted together and inside lined with feathers. The eggs, mostly three in a clutch, are fleshy white.

KEY TO THE SPECIES OF APHELOCEPHALA

1. Upper parts plain olive-brownish or greyish, pileum somewhat darker than back. No pectoral collar 2.
 — Back and rump chestnut-brown, pileum and upper tail coverts hair-brown. With a black or chestnut pectoral collar 4.
 2. Flanks pale greyish brown, sometimes faintly shaded with rufescent 3.
 — Flanks cinnamon-rufous 5. *A. CASTANEIVENTRIS*.
 3. Darker 1. *A. LEUCOPSIS LEUCOPSIS*.
 — Paler 2. *A. LEUCOPSIS PALLIDA*.
 4. Pectoral band broad, chestnut 3. *A. PECTORALIS*.
 — Pectoral band narrow, black. 4. *A. NIGRICINCTA*.

1. *Aphelocephala leucopsis leucopsis* (Gould). (Pl. 2, Fig. 1.)

Xerophila leucopsis Gould, Proc. Zool. Soc. Lond. Vol. 8, 1840, p. 175 (July 1841) (South Australia).

Fig. Gould, Birds Australia, Vol. 3, pl. 67.

Hab. South Queensland, New South Wales, Victoria, South Australia, Central- and parts of West Australia.

2. *Aphelocephala leucopsis pallida* Mathews.

Aphelocephala leucopsis pallida Mathews, Bull. Brit. Ornith. Club, Vol. 27, p. 62 (1911) (Leigh's Creek, South Australia).

Hab. Interior of South Australia (Leigh's Creek).

3. *Aphelocephala pectoralis* (Gould).

Xerophila pectoralis Gould, Ann. Mag. Nat. Hist. (4), Vol. 8, p. 192 (1871) (Port Augusta, South Australia).

Fig. Gould, Birds New Guinea, Vol. 1, pl. 12.

Hab. South Australia (Port Augusta).

4. *Aphelocephala nigrincincta* (North).

Xerophila nigrincincta North, The Ibis (7), Vol. 1, p. 340 (1895) (Missionary Plain, Central Australia).

Fig. Report Horn Exp. Centr. Austr. Vol. 2, pl. 7, fig. sup.

Hab. Central Australia.

5. *Aphelocephala castaneiventris* (Milligan).

Xerophila castaneiventris Milligan, Emu, Vol. 3, p. 70 (1903) (Day Down, Murchison District).

Fig. Emu, Vol. 4, 1905, pl. 13, f. 1.

Hab. West Australia: Murchison District, Central- and Western Division, as far north as Gascoyne River.

5. GENUS SPHENOSTOMA GOULD

Sphenostoma Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 149 (1838) (sp. un. : *S. cristatum* Gould).

Characters. Bill rather long, somewhat compressed, at base nearly as deep as wide; culmen distinctly curved; maxillary tomium without trace of subterminal notch; gonys decidedly concave. No rictal bristles. Nostrils basal, situated in a small, operculate groove, the roundish nasal opening wholly exposed, not covered by plumes. Latero-frontal plumules not directed forward. Wing moderately long, rounded; fourth and fifth primaries longest; first primary well developed, about as long as half the second. Secondaries very long, being equal to about six-sevenths of the whole wing. Tail conspicuously longer than wing, much rounded. Tarsus robust, relatively short, about equal to middle toe; acrotarsium distinctly scutellate. Toes rather long and large, claws relatively short, though strong. Feathers of pileum lengthened and narrowed, forming a long, though not dense, erect crest.

Coloration. Sexes alike. Upper parts and median tail feathers earthy brown, sometimes washed with rufescent; wings greyish brown, primaries narrowly edged with whitish along outer web. Rectrices (except middle pair) dark brown, with long white tips. Lower surface of body dingy whitish, more or less strongly washed with greyish brown or rufescent brown, especially on sides and flanks. Under tail coverts ashy brown, tipped with whitish. Wing 81-86, tail 94-97, tarsus about 27, bill 13-15 mm.

Geographical Distribution. Australia.

Habits and Nidification. This bird inhabits the low scrubby trees and bushes which stud the hot plains of Australia.

1. **Sphenostoma cristatum** Gould.

Sphenostoma cristatum Gould, Proc. Zool. Soc. Lond. Vol. 5, 1837, p. 150 (1838) (« in Novâ Cambriâ Australi, apud oram orientalem »).

Fig. Gould, Birds Austr. Vol. 3, pl. 17.

Hab. Queensland, New South Wales, Central-, West- and North-western Australia.

6. GENUS PARISOMA SWAINSON 1)

Subgenus **Parisoma** Swainson (& J. Richardson), Fauna Boreali-Amer. Vol. 2, p. 490 (1831) (sp. typ. : « Le Grignet » = *P. subcaeruleum* Vieillot).

Parosoma L. Agassiz, Nomencl. Zool., Index, p. 274 (1846) (nom. emend.).

Ægithalopsis Heine. Journ. f. Ornith. Vol. 7, p. 431 (1859) (nom. emend.).

Characters. Bill not unlike that of *Parus*, but laterally much compressed. Culmen distinctly ridged, gradually curved from base to tip, slightly uncinat; maxillary tomium with slight subterminal notch; gonys straight, in terminal third slightly ascending. Rictal bristles short, though rather stiff. Nostrils lateral, longitudinal, situated in a large, distinctly operculate groove; the slit-like nasal opening usually quite exposed, in *P. p. plumbeum* and *P. p. orientale*, however, covered by the antrorse, latero-frontal plumules. Wing long, somewhat rounded; third, fourth and fifth primaries longest, second equal to eighth; first primary as long as, or rather longer than, half the second. Tail equal to, or rather longer than, wing, strongly rounded. Tarsus slender, somewhat longer than middle toe without claw; acrotarsium distinctly scutellate. Toes slender, with rather long, much compressed, acute claws; hallux about equal in length to outer toe. Wing 60-70, tail 58-73 mm.

Coloration. Above grey or plumbeous; wings dusky, with whitish or pale greyish markings; tail blackish, the outer rectrices with long white tips. Under parts white or pale greyish, throat and foreneck often streaked with dusky; flanks and under tail coverts white, greyish, buff or light chestnut. Bill black. Sexes alike.

1. In the « Tierreich » Livr. 18, p. 135, I also included in the above genus *Sylvia lugens* Rüppell, *Parisoma jacksoni* Sharpe and *Sylvia blanfordi* Seebohm. Prof. Neumann, however, has pointed out to me that these three species were true Warblers (*Sylvia*). Reichenow (Vög. Afr. Vol. 3, p. 523) places, near *Parisoma*, his new genus *Apatema* (type : *Parisoma olivascens* Cassin) and *Hypodes* Cassin (type : *Eopsaltria cinerea* Cassin). According to Prof. Neumann, neither of them is referable to the family of *Paridae*, the former being a large *Alseonax*, the latter most probably identical with *Muscicapa lugens* Hartlaub.

Geographical Distribution. Tropical Africa. Seven forms.

Habits and Nidification unknown. We have only a note by Heuglin, that, in its habits, *P. plumbeum* reminds one rather of the Flycatchers.

Observations. The systematic position of this genus is still far from being satisfactorily established, and it may yet turn out to belong to the *Muscicapidae*.

KEY TO THE SPECIES AND SUBSPECIES OF PARISOMA

1. With a black band across foreneck 3. *P. BÖHMI*.
— No black cross-band on foreneck 2.
2. Under tail coverts clear chestnut; throat broadly streaked with black 3.
— Under tail coverts white or fulvous, but not chestnut 4.
3. Upper parts darker, more plumbeous 1. *P. SUBCÆRULEUM SUBCÆRULEUM*.
— Upper parts paler, more ashy grey 2. *P. SUBCÆRULEUM CINERASCENS*.
4. Upper parts dull brownish grey; lower throat and foreneck conspicuously streaked with dusky 4. *P. LAYARDI*.
— Upper parts pure grey; throat and foreneck uniform whitish, not streaked 5.
5. Rectrices brownish black, the outer ones very slightly tipped with light grey 7. *P. HOLOSPIDIUM*.
— Rectrices blackish, the outermost for the greater part white 6.
6. Upper parts darker grey; outermost rectrix with outer web and apical third of inner web white, penultimate rectrix black with a small white apical spot 6. *P. PLUMBEUM ORIENTALE*.
— Upper parts lighter grey; outermost rectrix, with the exception of the basal third of inner web, entirely white, penultimate rectrix with whole outer web and long tip to inner web white 5. *P. PLUMBEUM PLUMBEUM*.

1. *Parisoma subcæruleum subcæruleum* (Vieillot).

Sylvia subcærulea Vieillot, Nouv. Dict., Hist. Nat. Vol. 11, p. 188 (1817) (based on « Le Grignet », Levaillant, Ois. d'Afr. Vol. 3, pl. 126, f. 1 : « sur les bords de la rivière Gaus, Goud (d'Or) ou Gaurits; je l'ai trouvée répandue depuis là jusqu'au Brake-Rivier »).

Parisoma rufiventer Swainson, Classif. Birds, Vol. 2, p. 247 (1837) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 126).
Sylvia erythropygos Lichtenstein, Verz. Samml. Kaffernland, p. 14 (1842) (Caffraria).

Fig. Levaillant, Ois. d'Afr. Vol. 3, pl. 126, f. 1.

Hab. South Africa (Cape Colony) and South-eastern Africa (Natal, Oranje Colony, Transvaal, Matabeleland).

2. *Parisoma subcæruleum cinerascens* Reichenow.

Parisoma subcæruleum cinerascens Reichenow, Ornith. Monatsber. Vol. 10, p. 77 (1902) (Damaraland).

Hab. S. W. Africa : Benguela and Damaraland.

3. *Parisoma böhmi* Reichenow.

Parisoma böhmi Reichenow, Journ. f. Ornith. Vol. 39, p. 209, pl. 2, f. 2 (1882) (Seke in Ugogo).

Fig. Journ. f. Ornith. Vol. 30, pl. 2, f. 2.

Hab. Eastern Africa : from Somaliland southward to central German East Africa (Ugogo).

4. *Parisoma layardi* Hartlaub.

Parisoma layardi Hartlaub, The Ibis, Vol. 4, p. 147 (1862) (Cape Colony).

Stenostira schistacea Heuglin, Ornith. N. O. Afr. Vol. 1, II, p. 433 (1871) (« Kaplandschaft »).

Hab. Southern- and South-western Africa (Cape Colony, Oranje, Namaqua, Damaraland etc.). [Probably a subspecies of *P. plumbeum*.]

5. ***Parisoma plumbeum plumbeum* (Hartlaub). (Pl. 2, Figs. 7a, 7b.)**

Stenostira plumbea G. Hartlaub, Journ. f. Ornith. Vol. 6, p. 41 (1858) (ex J. Verreaux MS. : Casamanze River in the interior of Senegambia).

Parisoma melanurum Cassin, Proc. Acad. Nat. Sc. Philad. 1859, p. 51 (1859) (Camma and Rembo, Gaboon).

Parisoma catoleucum Reichenow, Ornith. Monatsber. Vol. 8, p. 5 (1900) (« Chamba im Niassa-Gebiet »).

Hab. Western Africa (from Senegambia to Benguela), North-east Africa (White-Nile district) and South-eastern Africa (Natal, Swaziland; Nyasaland).

N. B. Specimens from Nyasaland are not quite typical. If separable, they are entitled to the name *P. plumbeum catoleucum*.

6. ***Parisoma plumbeum orientale* Reichenow & Neumann.**

Parisoma orientale Reichenow & Neumann, Ornith. Monatsber. Vol. 3, p. 74 (1895) (Kibwezi, South Ukamba).

Hab. British East Africa : Taro desert, Kibwezi (Southern Ukamba).

7. ***Parisoma holospodium* Bates.**

Parisoma holospodium G. L. Bates, Bull. Brit. Ornith. Club, Vol. 25, p. 27 (1909) (Bitye, River Ja, Cameroon).

Hab. West Africa : Bitye, River Ja, in Cameroon.

2. SUBFAM. PSALTRIPARINÆ

THE LONG-TAILED TITS

This group comprises the Long-tailed Tits, small-sized birds with very small, strongly convex bill, graduated tail, composed of narrow, at tip rather attenuated rectrices, and with interorbital septum contracted to a slender, horizontal bar, separating two very large foramina.

Characters. Bill small, much less than half as long as head, about equal to length of hallux (without claw), with outlines strongly convex; culmen strongly curved, abruptly contracted terminally; gonys distinctly ascending terminally. Nasal fossa large, occupying about basal half of maxilla, entirely concealed by dense, antrorse, latero-frontal plumules. Wing short, rounded; fourth, fifth and sixth primaries longest; second primary always shorter than seventh, being equal to eighth or ninth; first primary about half as long as second, sometimes slightly shorter, sometimes very little longer (*Psaltria*); wing-tip decidedly shorter than tarsus. Tail graduated, usually longer, in one genus (*Psaltria*) slightly shorter than wing; rectrices narrow, somewhat attenuated at tip. Tarsus little less than twice as long as middle toe (without claw); scutes of acrotarsium often inclined to fuse into a single, long lamina; middle toe longest, outer toe slightly longer than inner; basal phalanx of middle toe adherent for decidedly less than its entire length to inner toe, but for its entire length to outer toe; hallux about as long as outer toe, but much stouter. Interorbital septum contracted to a slender, horizontal bar, separating two very large foramina which extend much the greater part of the distance, longitudinally, across orbit. Plumage exceedingly soft and copious.

Coloration variable (see genera). Sexes alike.

Geographical Distribution. Palearctic, Nearctic and Indo-Malayan Regions.

Nidification. Nest very bulky, purse-like, suspended or attached to twigs of trees or bushes. Eggs white, with or without reddish brown specks.

KEY TO THE GENERA OF PSALTRIPARINÆ

1. Tail excessively graduated (the outermost rectrix being about half as long as the median) and much longer than the wing, the difference being at least equal to middle toe with claw, but generally much more 7. Genus *ÆGITHALOS*.
- Tail much less graduated (the outermost rectrix being at least two thirds as long as the median), equal to, slightly shorter or longer than wing, the difference between length of wing and tail being decidedly less than length of tarsus. 2.
2. Basal phalanx of middle toe adherent to lateral toes for its entire length. Tail equal to, or slightly shorter than, wing 3.
- Basal phalanx of middle toe adherent to outer toe only for greater part of its length, to inner toe for a less distance. Tail decidedly longer than wing. . . . 10. Genus *PSALTRIPARUS*.
3. First primary slightly longer than half the second. Tail slightly shorter than wing. Bill thick, at base decidedly deeper than wide 9. Genus *PSALTRIA*.
- First primary equal to, or slightly shorter than, half the second. Tail about equal to wing. Bill more compressed, at base decidedly wider than deep. 8. Genus *ÆGITHALISCUS*.

7. GENUS *ÆGITHALOS* JOH. HERMANN

Ægithalos J. Hermann, *Observ. Zool.* p. 214 (1804) (type : *Pipra europaea* J. Hermann).

Acredula C. L. Koch, *Syst. Baier. Zool.* p. 199 (1816) (type : *Acredula caudata*).

Mecistura Leach, *Cat. Mamm. and Birds Brit. Mus.* p. 17 (1816) (sp. un. : *M. vagans* Leach).

Paroides L. Brehm, *Isis*, Vol. 21, p. 1284 (1828) (type : *Parus caudatus* Linnæus).

Megistura G. R. Gray, *List Genera of Birds*, p. 23 (1840) (nom. emend. pro *Mecistura* Leach).

Orites (nec Keyserling & Blasius 1840!) G. R. Gray, *List Genera of Birds*, ed. 2, p. 32 (1841) (sp. un. : *O. caudatus*).

Subgenus *Megisturus* Temminck & Schlegel, *Fauna Japon. Aves*, p. 71 (1848).

Characters. Bill very small, much less than half as long as head (exposed culmen about equal to length of hallux without claw), very much deeper than wide; culmen strongly curved, gonys less so. Nostrils small, nearly circular, entirely hidden by the antrorse, latero-frontal plumules. Rictal bristles numerous, though soft and short. Wing rather long, somewhat pointed; fourth and fifth primaries longest; sixth a little shorter, but considerably longer than third; first primary decidedly less than half the second. Tail much longer than wing, emarginate and at the same time much graduated; the rectrices rather narrow, lengthened, somewhat attenuated at tip. Submedian pair longest, the median distinctly shorter and about equal in length to the fourth from outside; outer rectrices strongly graduated, the outermost being about half as long as the middle pair. Tarsus slender, somewhat shorter than twice the length of middle toe without claw; scutes of acrotarsium inclined to fuse into a single, long lamina; outer toe slightly longer than inner one; hallux about as long as outer toe, but much stouter, with a much stronger as well as longer claw; outer toe united to middle one for its basal phalanx. Wing 54-66, tail 65-100 mm.

- Upper back mostly grey, though sometimes more or less mixed with black 12.
8. Head above uniform white without dusky stripes on sides of crown 1. A. CAUDATUS CAUDATUS.
- Head not uniform white, there being always more or less well-marked brown or black stripes along sides of crown, though sometimes merely indicated by some brownish or blackish spots above the eye and on sides of occiput 9.
9. Black crown-stripes broad, conducted on to the base of the bill; forehead and broad stripe along middle of crown and occiput pure white. No dusky spots on chest. Wing 58-62 mm. 6. A. CAUDATUS TRIVIRGATUS.
- Brown or black crown-stripes reaching not much beyond anterior angle of eye. Chest with a row of distinct dusky or brown spots 10.
10. Lateral interscapular feathers uniform rosy 11.
- Lateral interscapular feathers mixed with ashy grey. 4. A. CAUDATUS TAURICUS 1).
11. Wing longer : 62-67 mm. Stripes along sides of crown narrower, brown or black; median portion of crown purer white 2. A. CAUDATUS EUROPÆUS.
- Wing shorter : 58-62 mm. Stripes along sides of crown broader, always deep black; median portion of crown more restricted and often obscured 3. A. CAUDATUS ROSEUS.
12. Lateral crown-stripes black 13.
- Lateral crown-stripes pale brown 14.
13. Larger : wing of male 60-61, tail 79-84 mm. Hindneck extensively black, contrasting with the pale ashy grey back and rump. Shoulders conspicuously rosy 8. A. CAUDATUS ITALIÆ.
- Smaller : wing of male 57-58, tail 77-79 mm. Only a narrow blackish band across hindneck, not abruptly contrasting with dark grey back. Shoulders dark grey, without rosy tinge 7. A. CAUDATUS IRBII.
14. Larger : wing 60-63 mm. 10. A. CAUDATUS MAJOR.
- Smaller : wing 56-58 mm. 9. A. CAUDATUS SICULUS.

1. *Ægithalos caudatus caudatus* (Linnæus). (Pl. 3, Fig. 9.)

Parus caudatus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) («Habitat in Europa»; we fix Sweden as type locality).
Lanius biarmicus (nec *Parus biarmicus* Linnæus 1758) Linnæus, Fauna Suec., ed. 2, p. 29, t. 1, f. 84 (1761) (errore ! part. : excl. cit. Albin & Edwards).

Paroides pinetorum Brehm, Vogelfang, p. 243 (1855) (part. : «in einem grossen Teile von Europa»).

Acredula macrura Seebohm, Hist. Brit. Birds, Vol. 1, p. 487, in text (1883) («from St. Petersburg eastwards»).

Acredula caudata sibirica Seebohm, Birds Japan. Emp. p. 88 (1890) («Central Siberia»).

[*Ægithalos caudatus*] *japonica* Prazák, Journ. f. Ornith. Vol. 45, p. 291 (1897) («im nördlichen Japan»).

Acredula trivirgata magna Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 475 (1907) (Seoul, Korea; = juv.).

Fig. Dresser, Birds Europe, Vol. 3, pl. 104; Naumann, Vög. Deutschl. Vol. 4, t. 95, ff. 4-6.

Hab. Northern- and Eastern Europe, Siberia, Corea, Northern Japan (Yezo; Iturup, Kuril Isl.). In winter in Central Germany, Roumania, Austria and on the northern slopes of the Caucasus, sometimes also in Hesse, Rhine province, Belgium and in the north of France.

2. *Ægithalos caudatus europæus* (Hermann).

Pipra? europæa J. Hermann, Observ. Zoolog. p. 214 (1804) (Basel).

Paroides longicaudus Brehm, Handb. Vög. Deutschl. p. 470 (1831) (part. : «im mittleren Deutschland»).

Paroides pinetorum Brehm, Vogelfang, p. 243 (1855) (part. : «in einem grossen Teile von Europa»).

Fig. Journ. f. Ornith. Vol. 34, 1886, pl. 16, Vol. 41, 1893, pl. 4.

Hab. Southern- and Central Europe : North France, Belgium, Holland, Western Germany (Rhine province, eastwards to Hesse and Thuringia), Austria, Switzerland, Northern Italy, Hungary, Serbia, Bosnia, Bulgaria and Roumania.

1) Unknown to the author.

3. *Ægithalos caudatus roseus* (Blyth).

Mecistura vagans Leach, Cat. Mamm. and Birds Brit. Mus. p. 17 (1816) (Devonshire; nom. nud.).

Mecistura rosea Blyth, in Gilbert White, Nat. Hist. Selborne, p. 111 (1836) (England).

Mecistura longicaudata Macgillivray, Hist. Brit. Birds, Vol. 2, p. 454 (1839) (England).

Fig. Dresser, Birds, Europe, Vol. 3, pl. 103.

Hab. Great Britain and Ireland. In winter in South France (Pyrenees).

4. *Ægithalos caudatus tauricus* (Menzbier)

Acredula rosea taurica Menzbier, Bull. Brit. Ornith. Club, Vol. 13, p. 49 (1903) (« in sylvis montium Yaïla peninsulae Tauricae »).

Hab. South Russia : Forests of the Yaïla Mountains, Crimea.

5. *Ægithalos caudatus macedonicus* Dresser.

Acredula macedonica Dresser, Bull. Brit. Ornith. Club, Vol. 1, p. 15 (1892) (« in monte Olympo »).

Fig. Dresser, Birds Europe, Vol. 9, t. 655, f. 1.

Hab. Greece (Olymp, Othrys, Thessalia, Lamia, Akarnania etc., but not in Morea), northwards as far as Monastir in Turkey.

6. *Ægithalos caudatus trivirgatus* (Temminck & Schlegel).

Parus (Megisturus) trivirgatus Temminck & Schlegel, Fauna Japon. Aves, p. 71, pl. 34 (1848) (« Japon »).

Hab. South Japan : Yezo and Kiusiu.

7. *Ægithalos caudatus irbii* (Sharpe & Dresser).

Acredula irbii Sharpe & Dresser, Proc. Zool. Soc. Lond. 1871, p. 312 (1871) (Gibraltar, Spain).

Ægithalus caudatus tyrrhenicus Parrot, Ornith. Jahrb. Vol. 21, p. 155 (1910) (Ajaccio, Corsica).

Fig. Dresser, Birds Europe, Vol. 3, t. 105, fig. sup.

Hab. Iberian Peninsula and Corsica.

8. *Ægithalos caudatus italiae* Jourdain.

Ægithalus caudatus italiae Jourdain, Bull. Brit. Ornith. Club, Vol. 27, p. 39 (1910) (Cremona, Italy).

Hab. Southern and Central Italy, along the Adriatic coast north to Venice; Elba (not in Sardinia); South France. Stragglers have been taken in Southern Tyrol and near Paris.

9. *Ægithalos caudatus siculus* (Whitaker).

Acredula sicula Whitaker, Bull. Brit. Ornith. Club, Vol. 11, p. 52 (1901) (Sicily).

Fig. The Ibis (8), Vol. 2, p. 54, pl. 2.

Hab. Mountains of Sicily.

10. *Ægithalos caudatus major* (Radde).

Acredula tephronota var. *major* Radde, Ornith. Caucas. p. 144, pl. 6, f. 1 (1884) (Tiflis and Shamchor, Caucasus).

Mecistura irbyi var. *caucasica* T. Lorenz, Beitr. Ornith. Nordseite Kaukas. p. 60 (1887) (Podkumok, N. Caucasus).

Acredula dorsalis Madarász, Term. Füzet. Vol. 23, p. 202, pl. 7, f. 1 (1900) (Pjatigorsk, N. Caucasus; type examined).

Acredula senex Madarász, ibidem, p. 202, pl. 7, f. 2 (1900) (Pjatigorsk, N. Caucasus; type examined).

Fig. Dresser, Birds Europe, Vol. 9, pl. 655, f. 2.

Hab. Caucasus : northern slopes, Kura valley.

11. *Ægithalos caudatus alpinus* (Hablizl).

Parus alpinus Hablizl, in Pallas, Neue Nord. Beytr. Vol. 4, p. 49 (1783) (« auf dem Samamisischen Gebirge », province Ghilan, N. Persia).

Orites tephronotus Günther, The Ibis (new ser.), Vol. 1, p. 95, pl. 4 (1865) (« Asiatic side of the Bosphorus »).

Mecistura pöltzami Severtzow, Izv. Obsch. Moskov. Vol. 8, no. 2, p. 135, pl. 8, f. 1 (1873) (Astrabad, N. Persia).

Fig. Dresser, Birds Europe, Vol. 3, pl. 105, f. 2.

Hab. Environs of Constantinople [Pera, Belgrade 1), Buyukdere, Bagsheishkoë etc.], Asia Minor as far east as the Taurus Mountains, in the north to Lenkoran, and along the south shore of the Caspian Sea through the provinces of Ghilan and Mazanderan to Astrabad, North Persia.

12. *Ægithalos caudatus passekii* (Sarudny).

Acredula tephronota passekii Sarudny, Ornith. Monatsber. Vol. 12, p. 164 (1904) (« bewohnt die Eichenwälder der Gebirge zwischen dem Iranischen Hochlande und der Ebene Mesopotamiens »).

Hab. Oak-forests of the mountains of S. W. Persia (Farsistan : Shiráz, Kaluni etc.).

1) Not Belgrad in Serbia, as erroneously stated by Bianchi.



FAM. PARIDÆ

1. PENTHORNIS SEMILARVATUS. 2. PARUS REX ♂ AD. 3. PARUS FUNEREUS. 4. PARUS ATER CYPRIOTES.
 5. PARUS ATER LEDOUCCI. 6. FOOT OF PARUS MAJOR MAJOR. 7. PARUS NIGRILORIS. 8. PARUS ATRICAPILLUS MONTANUS.
 9. PARUS PALUSTRIS COMMUNIS. 10. PARUS SUPERCILIOSUS. 11. PARUS CYANUS CYANUS. 12. PARUS CYANUS TIANSHANICUS.



FAM. PARIDÆ

1. APHELOCEPHALA LEUCOPSIS LEUCOPSIS. 2. PSALTRIA EXILIS. 3. REMIZA PENDULINA CASPIA.
 4. AURIPARUS FLAVICEPS FLAVICEPS. 5. FOOT OF CHOLORNIS PARADOXA. 6a. MELANOCHLORA SULTANEA SULTANEA ♂ AD.
 6b. TAIL OF MELANOCHLORA SULTANEA SULTANEA. 7a. PARISOMA PLUMBEUM PLUMBEUM.
 7b. FOOT OF PARISOMA PLUMBEUM PLUMBEUM. 8. PARUS VARIUS OWSTONL. 9. TAIL OF PARUS MAJOR MAJOR.
 10. TAIL OF PANURUS BIARMICUS BIARMICUS.



FAM. PARIDÆ

1. NEOSUTHORA DAVIDIANA DAVIDIANA. 2. PARADOXORNIS HEUDEI. 3. SUTHORA CONSPICILLATA.
 4. ÆGITHALISCUS FULIGINOSUS. 5. ANTHOSCOPIUS ANSORGEL. 6. FOOT OF MOHOVA OCHROCEPHALA.
 7. FOOT OF FINSCHIA NOVÆ-SEELANDIÆ. 8. FOOT OF CERTHIPARUS ALBICILLA. 9. TAIL OF ÆGITHALOS CAUDATUS CAUDATUS.

13. *Ægithalos caudatus glaucogularis* (Moore).

Orites ? glaucogularis 1) Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 140 (1855) (China).

Mecistura swinhoei (Zelebor MS.) Pelzeln, Reise Novara, Vol. 1, II, p. 66, pl. 3, f. 1 (1865) (Shanghai; = juv., type examined).

Fig. Gould, Birds Asia, Vol. 2, pl. 69.

Hab. Central China : valley of the Yangtsekiang, Shanghai, Ningpo etc.

14. *Ægithalos caudatus vinaceus* (J. Verreaux).

Mecistura vinacea 2) Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 39 (1870) (Ourato, Mongolia; cfr. Verreaux, ibidem, Vol. 7, 1871, Bull. p. 56; = juv., type in Paris Museum examined).

Acredula calva Pleske, Bull. Brit. Ornith. Club, Vol. 3, p. 13 (1893) (« Upper Chuan-che, China »).

Fig. Aves Przewalsk. Livr. 4, 1905, pl. 7, f. 1, 2 (= ad.); Verreaux, Nouv. Arch. Mus. Paris, Vol. 8, 1872, Bull. pl. 2, f. 3 (= juv.).

Hab. Mountains of the Upper Chuanche in N. W. China (Kansu) and South Mongolia (Uroto, Alashan).

8. GENUS *ÆGITHALISCUS* CABANIS

Ægithaliscus Cabanis, Mus. Heinean. Vol. 1, p. 90 (1851) (sp. typ. : *Parus erythrocephalus* Vigors).

Acanthiparus Gould, Birds Asia, Vol. 2, Pt. 7, pl. 67 (1855) (sp. typ. : *A. niveogularis* Moore).

Characters. Bill variable as to relative length and shape, in *A. erythrocephalus* and allies very much as in *Ægithalos*, but less compressed, being short, thick, at base distinctly wider than deep, with culmen strongly curved for its entire length, and with gonys conspicuously ascending terminally. *A. niveogularis*, *A. bonvaloti* and *A. iouschistos*, on the other hand, have the bill much more compressed (even more so than in *Ægithalos*), and decidedly longer, with culmen much less curved and gonys straighter, resembling in this respect the American genus *Psaltiriparus*, from which they chiefly differ by having the tail shorter than, or equal to, the wing (instead of longer), and the rectrices as well as the remiges somewhat broader. *A. fuliginosus* being, however, intermediate between the two groups typified by *A. erythrocephalus* and *A. niveogularis*, I deemed it better not to separate the genera *Ægithaliscus* and *Acanthiparus*, since, in other structural details, they are practically identical. Rictal bristles minute, soft, though always present. Nostrils roundish, entirely hidden by antrorse, latero-frontal plumules. Wing rather long, much rounded; fourth, fifth and sixth primaries longest; first primary a little shorter than, or as long as half the second. Tail slightly shorter than, or equal to wing, much rounded and at the same time slightly emarginate, the submedian pair of rectrices being a little longer than the median; the rectrices conspicuously rounded at tip. Tarsus slender, about twice as long as middle toe without claw; acrotarsium distinctly scutellate; outer toe slightly longer than inner one; hallux about as long as outer toe, but much stouter, its claw much shorter than the digit, strongly arched; basal phalanx of middle toe adherent to lateral toes for its entire length. Wing 46-58, tail 44-58 mm.

Coloration. Back slate-grey, olive-grey, or sepia-brown (*A. fuliginosus*); median portion of crown usually different from back, either rufous or fawn-colour, or white anteriorly passing into smoky brown on hind crown and nape, in one species (*A. fuliginosus*) sepia-brown

1) Misprinted *Acredula glaucovirens* Reichenow, Ornith. Monatsber. Vol. 2, 1894, p. 28.

2) Although in juvenile plumage, the type certainly belongs to this form and not to *A. c. glaucogularis* as erroneously admitted in « Tierreich », Livr. 18, p. 118, the dark belly and the large size, besides the locality, leave no doubt whatever.

like back. Eye region and broad superciliary stripe black, or silky grey (*A. fuliginosus*). Throat and foreneck white, throat (in *A. leucogenys* also the chin) often black or grey; remaining under parts buff, ferruginous or vinaceous isabelle, sometimes a brown band across chest. Feet light brown. Bill black.

Geographical Distribution. India, Western- and Southern China. Eleven forms.

Habits and Nidification. — Exactly like *Ægithalos*.

Observations. The members of this genus differ from *Ægithalos* chiefly by having the tail much shorter and far less graduated, the outermost rectrix being about two-thirds as long as the tail. Two groups can easily be arranged, one comprising the rufous-headed species, *A. erythrocephalus*, to which the scarce *A. leucogenys* most likely also belongs, while the other consists of *A. niveogularis*, *A. bonvaloti*, *A. iouschistos* and the somewhat aberrant *A. fuliginosus*.

KEY TO THE SPECIES AND SUBSPECIES OF *ÆGITHALISCUS* ¹⁾

1. Throat black. Bill short and thick, with culmen strongly decurved 2.
- Throat never black, being either white or silvery grey; sometimes the dusky bases of the feathers, especially on sides of throat showing through, without forming, however, a plain, black throat-patch. Bill slender, longer, with culmen much less decurved 7.
2. Chin and throat black; ear coverts greyish brown. (Breast and abdomen buffy isabelline, inclining to deep buff on flanks; pileum pale dull reddish brown.) 6. *A. LEUCOGENYS*.
- Chin white, abruptly contrasted with black of throat. Ear coverts deep black like remainder of sides of head 3.
3. With a distinct white eyebrow from above the eye to sides of neck; under parts below black throat-patch buff, darkening to vinous ochraceous on sides and flanks. (Top of head chestnut-rufous) 1. *A. ERYTHROCEPHALUS ERYTHROCEPHALUS*.
- No distinct white eyebrow, the posterior superciliary region being black, sometimes narrowly streaked with white; black throat-patch followed by a well-defined, pure white jugular crescent; a narrow band across chest as well as sides and flanks ochraceous or ferruginous, abruptly contrasting with white centre of breast and abdomen, or else whole lower parts below white jugular band uniform ferruginous 4.
4. Posterior superciliary region distinctly, though narrowly

¹⁾ *A. sharpei* Rippon, unknown to the author, could not be included in the key. From the short diagnosis: « Similis *A. bonvaloti*, sed regione parotica saturate brunnea, nec postica cinnamomea, et torques collari brunneo distinguendus » (!) it is even impossible to say to which other species this supposed new form might be most nearly allied.

- streaked with white. Whole lower plumage below white jugular crescent deep ferruginous, centre of belly not abruptly white* 2. *A. ERYTHROCEPHALUS MANIPURENSIS.*
- *Posterior superciliary region entirely black or with mere traces of greyish white edges to some of the feathers. A distinct narrow band across chest, sides and flanks ochraceous or ferruginous, abruptly contrasted with the extended white area on middle of belly* 5.
5. *Head above, cross-band on chest as well as sides and flanks paler, ochraceous.* 3. *A. ERYTHROCEPHALUS PULCHELLUS.*
- *Head above, cross-band on chest as well as sides and flanks deeper, ferruginous* 6.
6. *Ferruginous of head paler; cross-band on chest and sides deeper, almost chestnut* 4. *A. ERYTHROCEPHALUS TALIFUENSIS.*
- *Ferruginous of head darker; cross-band on chest and sides clearer, cinnamon-rufous* 5. *A. ERYTHROCEPHALUS CONCINNUS.*
7. *Eye region and broad superciliary stripe somewhat glossy silky grey. Upper parts of the head and back sepia-brown (Throat pale grey, sides of neck and foreneck white; chest sepia-brown, passing into vinous brown on flanks and paling to white on middle of belly.)* 11. *A. FULIGINOSUS.*
- *Eye region and broad superciliary stripe deep black. Back light grey, slightly shaded with olive, central stripe on crown different from colour of back* 8
8. *Median crown-stripe from forehead to nape fawn-colour. (Chin and throat silvery white, remainder of lower parts clear ferruginous)* 8. *A. IOUSCHISTOS.*
- *Median crown-stripe white anteriorly, becoming smoky brown on posterior portion* 9.
9. *Breast and abdomen pinkish isabelline, separated from the white of throat and foreneck by a distinct, narrow, smoky brown cross-band.* 10. *A. NIVEOGULARIS.*
- *Breast and abdomen bright ferruginous, passing into white on middle of abdomen. No brown cross-band on chest* 9. *A. BONVALOTTI.*

1. *Ægithaliscus erythrocephalus erythrocephalus* (Vigors).

Parus erythrocephalus Vigors, Proc. Comm. Zool. Soc. Lond. Vol. 1, p. 23 (1831) (Himalayan Mountains).

Fig. Gould, Birds Asia, Vol. 2, pl. 64.

Hab. Himalayas, from Hazāra District to Bhutan, at elevations of from 6000 to 10,000 feet.

2. *Ægithaliscus erythrocephalus manipurensis* Hume.

Ægithaliscus manipurensis Hume, Stray Feath. Vol. 11, p. 254 (1888) (Manipur).

Hab. Assam, south of the Brahmaputra River : Shillong and Nāga Hills ; Manipur.

3. *Ægithaliscus erythrocephalus pulchellus* Rippon.

Ægithaliscus pulchellus Rippon, Bull. Brit. Ornith. Club, Vol. 11, p. 11 (1900) (Nanoi, Loi Mai, south. Shan States).

Fig. The Ibis (8), Vol. 1, 1901, p. 528, pl. 11, f. 2.

Hab. Burma : Nanoi, Loi Mai, Kalaw, Karennee, Ménétaung, Loi Sali Range, in the southern Shan States, at elevations of from 3000 to 6000 feet.

4. *Ægithaliscus erythrocephalus talifuensis* Rippon.

Ægithaliscus talifuensis Rippon, Bull. Brit. Ornith. Club, Vol. 14, p. 18 (1903) (Gyi-dzin Shan, east of Talifu, W. Yun-nan).

Hab. Mountains east of Talifu, W. Yunnan, S. W. China, and adjoining parts of Upper Burma (Bhamo).

5. *Ægithaliscus erythrocephalus concinnus* (Gould).

Psaltia concinna Gould, Birds Asia, Vol. 2, pl. 65 (1855) (China).

Ægithaliscus anophrys Swinhoe, The Ibis (new ser.), Vol. 4, p. 64 (1868) (Tingchow, W. Fohkien).

Hab. China, south of the Yangtze valley from Tchekiang and Fohkien westward to (?) Szechuen; Hainan; Formosa.

6. *Ægithaliscus leucogenys* (Moore).

Orites? leucogenys Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 139 (1855) (« Afghanistan, in the woods of Balu Chughur, at 4000 feet elevation »).

Fig. Gould, Birds Asia, Vol. 2, pl. 66.

Hab. North-western portion of Kashmir (Gilgit, Bargo, Singal etc.) and adjoining parts of Afghanistan, at elevations of from 5500 to 7000 feet.

7. *Ægithaliscus sharpei* Rippon.

Ægithaliscus sharpei Rippon, Bull. Brit. Ornith. Club, Vol. 14, p. 84 (1904) (Mt. Victoria, southern Chin Hills).

Hab. Burma: Mount Victoria in the southern Chin Hills.

8. *Ægithaliscus iouschistos* (Hodgson).

Parus iouschistos Hodgson, Journ. Asiat. Soc. Bengal, Vol. 13, II, p. 943 (1844) (Nepal).

Fig. Gould, Birds Asia, Vol. 2, pl. 68.

Hab. Eastern Himalaya: Nepal, Sikkim, Bhutan, at elevations of from 9000 to 10,000 feet.

9. *Ægithaliscus bonvaloti* (Oustalet).

Acridula Bonvaloti Oustalet, Ann. Sc. Nat. Zool. (7), Vol. 12, p. 286, pl. 9, f. 1 (1891) (Ta-tsien-lu and Pendjama, Szechuen).

Hab. Western China: Tatsienlu and Pendjama in Western Szechuen.

10. *Ægithaliscus niveogularis* (Moore).

Orites (?) niveogularis Moore, Proc. Zool. Soc. Lond. Vol. 22, 1854, p. 140 (1855) (« North India »).

Fig. Gould, Birds Asia, Vol. 2, pl. 67.

Hab. N. W. Himalaya, Kashmir: Simla, Gulmurg, Dashgam etc. at elevations of from 6000 to 10,000 feet.

11. *Ægithaliscus fuliginosus* (J. Verreaux). (Pl. 3, Fig. 4.)

Mecistura fuliginosa J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 5, Bull. p. 36 (1869) (« dans la partie occidentale du Sse-tchuan »; cfr. J. Verreaux, ibidem, Vol. 7, 1871, Bull. p. 57).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, 1872, pl. 5, f. 4.

Hab. Mountains of Western China: Kansu, western Szechuen and southern Tsinling.

9. GENUS PSALTRIA TEMMINCK

Psaltia. Temminck, Pl. Col. pl. 600, f. 4 (1836) (sp. un.: *Psaltia exilis* Temminck).

Characters. Bill much less than half as long as head, rather broad and deep; culmen strongly curved, commissure smooth; gonys nearly straight for basal half, abruptly ascending terminally. Rictal bristles minute. Nostrils lateral, situated in a groove and entirely concealed by the dense, antrorse, latero frontal plumules. Wing short and rounded; fourth, fifth and sixth primaries longest; first primary more than half as long as second; secondaries relatively long, their length somewhat exceeding three-fourths of the whole wing. Tail slightly shorter than wing, much rounded, the outer rectrices being gradually shorter than the median ones. Tarsus

slender, more than twice as long as hind toe without claw; acrotarsium covered in front with scutes which, however, are often fused into a single lamina; outer toe adherent to middle one for its basal phalanx, the inner toe united for a less distance. Wing 40-46, tail 38-48 mm.

Coloration. Head above, wings and tail uniform brown; nape, back and upper tail coverts ashy, here and there tinged with brownish. Cheeks and ear coverts brownish white. Under surface dingy white, sides shaded with brownish. Sexes alike.

Geographical Distribution. Island of Java. *Monotypic*.

Habits. Boie (Journ. f. Ornith. Vol. 6, 1858, p. 365) tells us that, in habits, call-note and food, it closely resembles our Long-tailed Tit. Nothing appears to be known regarding its nidification.

1. ***Psaltria exilis*** Temminck. (Pl. 2, Fig. 2.)

Psaltria exilis Temminck, Pl. Col. pl. 600, f. 4 (1836) (Java).

Fig. Gould, Birds Asia, Vol. 2, pl. 63.

Hab. Island of Java.

10. GENUS PSALTRIPARUS BONAPARTE ¹⁾

Psaltriparus Bonaparte, Compt. Rend. Ac. Sc. Paris, Vol. 31, p. 478 (1850) (type : *Parus personatus* Bonaparte = *P. melanotis* Hartlaub).

Pysaltriparus Westernmann, Bijdr. Dierk. Vol. 1, no. 3, p. 16 (1851) (err. typogr.).

Psalatrirus J. W. v. Müller, Reise Ver. Staaten, Canada, Mex. Vol. 3, p. 571 (1865) (sp. un. : *P. melanotis*).

Psaltrites Cabanis, Journ. f. Ornith. Vol. 29, p. 333 (1881) (nom. emend.).

Characters. Bill very small, much less than half as long as head, much deeper than broad; culmen strongly curved, gonys less so. Nostril small, roundish or broadly ovate, concealed by the antrorse, latero-frontal plumules. Rictal bristles minute, only visible on close examination. Wing rather long, but much rounded; fourth, fifth and sixth primaries longest, third shorter than sixth, first primary about half as long as second. Tail slightly longer than the wing, the rectrices narrow with broadly rounded tips, much graduated. Tarsus about twice as long as middle toe without claw, slender, the acrotarsium distinctly scutellate; outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for greater part of its length, to inner toe for some distance. Wing 47-53, tail 50-62 mm.

Coloration. Above plain grey or olive, the pileum sometimes brownish; beneath pale grey or whitish, sometimes tinged with buffy or vinaceous on abdomen; sides of the head sometimes black.

Nidification. Nest a very bulky purse-like structure, suspended to twigs of bushes or small trees, composed of moss, lichens, spider's webs, and other soft materials, the entrance a small hole on one side near top. Eggs immaculate white.

¹⁾ Characters and key taken from Ridgway, Birds North- and Middle America, Vol. 3, 1904, pp. 423-436; cfr. also Oberholser, Auk, Vol. 20, 1903, pp. 198-201.

Geographical Distribution. Western United States and temperate parts of Mexico and Guatemala. Nine forms.

Observations. This genus is very nearly related to *Ægithaliscus*, from which it mainly differs by rather longer tail, broader remiges and rectices and different style of coloration.

KEY TO THE SPECIES AND SUBSPECIES OF PSALTRIPARUS

1. *With black on sides of head* 2.
- *No black whatever on sides of head* 7.
2. *Entire sides of head black* 3.
- *Sides of head only partly black* 5.
3. *Back and rump decidedly brown or olive* 4.
- *Back and rump olive-grey* 3. *P. MELANOTIS LLOYDI* ♂ ad.
4. *Back olive-brown, under parts strongly buff* 1. *P. MELANOTIS MELANOTIS* ♂ ad.
- *Back olive or greyish olive, under parts dull white, very slightly,*
if at all, tinged with buff 2. *P. MELANOTIS IULUS* ♂ ad.
5. *Back and rump decidedly brown or olive* 6.
- *Back and rump olive-grey* 3. *P. MELANOTIS LLOYDI* ♀ and ♂ juv.
6. *Back olive-brown, under parts strongly buff* 1. *P. MELANOTIS MELANOTIS* ♀ and ♂ juv.
- *Back olive or olive greyish, under parts dull white or but faintly*
tinged with buff 2. *P. MELANOTIS IULUS* ♀ and ♂ juv.
7. *Pileum grey, like back* 8.
- *Pileum brown, very different from grey of back* 9.
8. *Upper parts olive-grey, under parts darker* 4. *P. PLUMBEUS PLUMBEUS*.
- *Upper parts bluish grey, under parts paler* 5. *P. PLUMBEUS CECALMENORUM*.
9. *Back darker and more brownish grey* 10.
- *Back paler, clearer grey* 9. *P. MINIMUS GRINDÆ*.
10. *Darker : the sides and flanks strongly smoky brown* 11.
- *Paler : the sides and flanks more faintly smoky brown* 8. *P. MINIMUS CALIFORNICUS*.
11. *Darker* 7. *P. MINIMUS SATURATUS*.
- *Paler* 6. *P. MINIMUS MINIMUS*.

1. *Psaltriparus melanotis melanotis* (Hartlaub).

Parus melanotis Hartlaub, Rev. Zool. Vol. 7, p. 216 (1844) (Guatemala).

Psaltriparus personatus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 31, p. 478 (1850) (Mountains of Southern Mexico).

Psaltrites helviventris Cabanis, Journ. f. Ornith. Vol. 29, p. 333 (1881) (Tehuantepec, Mexico?; = ♀).

Fig. Baird, Birds N. America, 1860, p. 396, pl. 53, f. 3; Westermann, Bijdr. Dierk. Vol. 1, no. 3, 1851, p. 16, plate, ff. 2, 3.

Hab. Southern Mexico (Guanajuato, Hidalgo, Mexico, Puebla, Vera Cruz, Michoacan, Oaxaca, Chiapas) and highlands of Guatemala.

2. *Psaltriparus melanotis iulus* Jouy.

Psaltriparus melanotis iulus Jouy, Proc. U. S. Nat. Mus. Vol. 16, p. 776 (1894) (Hacienda El Molino, Jalisco, S. W. Mexico).

Hab. Western- and Central Mexico (Jalisco, Zacatecas, San Luiz Potosi, Tepic).

3. *Psaltriparus melanotis lloydi* Sennett.

Psaltriparus lloydi Sennett, Auk, Vol. 5, p. 43 (Jan. 1888) (Limpia Canon, near Fort Davis, Presidio County, S. W. Texas).

Psaltiriparus santaritæ Ridgway, Proc. U. S. Nat. Mus. Vol. 10, p. 697 (Oct. 1888) (Santa Rita Mts., S. Arizona).
 Hab. S. W. Texas, S. New Mexico, southern Arizona (Chiricahua, Huachuca and Santa Rita Mts.), southward into North Sonora and Chihuahua.

4. ***Psaltiriparus plumbeus plumbeus*** (Baird).

Psaltiria plumbea Baird, Proc. Acad. Nat. Sc. Philad. Vol. 7, p. 118 (1854) (Little Colorado River, Arizona).

Fig. Baird, Birds N. America, 1860, p. 398, pl. 33, f. 2.

Hab. Arid interior districts of western United States, north to eastern Oregon and south-western Wyoming, east to Colorado and S. W. Texas, west to W. Nevada and S. E. California.

5. ***Psaltiriparus plumbeus cecaumenorum*** Thayer & Bangs.

Psaltiriparus plumbeus cecaumenorum Thayer & Bangs, Proc. Biol. Soc. Wash. Vol. 19, p. 20 (1906) (Sierra de Antonez, Central Sonora).

Hab. North Central Sonora; N. Chihuahua (?).

6. ***Psaltiriparus minimus minimus*** (Townsend).

Parus minimus Townsend, Journ. Acad. Nat. Sc. Philad. Vol. 7, 11, p. 190 (1837) (Columbia River).

Fig. Audubon, Birds America, ed. in-80, Vol. 2, 1841, pl. 130.

Hab. West slope of coast mountains of Oregon, California and Lower California, north to the Columbia River.

7. ***Psaltiriparus minimus saturatus*** Ridgway.

Psaltiriparus minimus saturatus Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Mount Vernon, Washington).

Hab. Vicinity of Puget Sound, Washington.

8. ***Psaltiriparus minimus californicus*** Ridgway.

Psaltiriparus minimus californicus Ridgway, Proc. Biol. Soc. Wash. Vol. 2, p. 89 (1884) (Baird, Shasta Co., California).

Hab. Interior districts of Oregon and California.

9. ***Psaltiriparus minimus grindæ*** Ridgway.

Psaltiriparus grindæ (Belding MS.) Ridgway, Proc. U. S. Nat. Mus. Vol. 6, p. 155 (1883) (Laguna, Lower California).

Hab. Cape St. Lucas district of Lower California.

3. SUBFAM. REMIZINÆ

THE PENDULINE TITS

This group comprises the so-called Penduline Tits, small-sized birds with slender, nearly straight, acute bill, even or emarginate tail, and the interorbital septum with a large central foramen.

Characters. Bill slender, much shorter than head, with both culmen and gonys nearly straight, and acute tip. Nostrils basal, roundish, non-operculate, either exposed (*Cephalopyrus*) or concealed by antrorse, latero-frontal plumules. Rictal bristles obsolete. Wing rather long, pointed (*Cephalopyrus*) or rounded; third and fourth, or third, fourth and fifth, primaries longest; second primary variable in length, sometimes (*Cephalopyrus*) nearly as long as third, sometimes conspicuously shorter, but always longer than seventh; first primary also variable in length, sometimes (*Cephalopyrus*) exceedingly small, about half as long as primary coverts, sometimes distinctly

longer than the latter, but always less than half as long as second. Tail shorter than wing, even, emarginate or slightly rounded. Tarsus much longer than exposed culmen; acrotarsium distinctly scutellate; outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, to inner toe for its entire length; hallux about equal to inner toe, but much stouter; claw compressed, strongly arched with acute tip. Interorbital septum with a large central foramen. Plumage less soft and copious than in the *Parinae* and *Psaltiriparinae*.

Colorations variable (see genera). Sexes alike or little different.

Geographical Distribution. Palæarctic, Nearctic, Indo-Malayan (one genus in Himalaya) and Ethiopian Regions.

Nidification. The nest, a bulky, globular or retort-shaped structure of twigs etc., with entrance a small hole on one side, is placed among twigs of bushes and low trees. The eggs are either uniform white (*Remiza*, *Anthoscopus*), or pale greenish blue, speckled with reddish brown (*Auriparus*), or uniform dark blue (?) (*Cephalopyrus*).

KEY TO THE GENERA OF REMIZINÆ

1. Nostrils large, exposed. Wing pointed; second primary nearly as long as third and fourth, which are the longest; first primary extremely small and narrow, scarcely half as long as primary coverts. Wing-tip much longer than tarsus. Tail about half as long as wing. Feathers of fore part of crown slightly lengthened and somewhat stiffened, forming a distinct, erect crest (Indian) . . . 14. GENUS CEPHALOPYRUS.
- Nostrils small, entirely concealed by antrorse, latero-frontal plumules. Wing rounded; second primary conspicuously shorter than third and fourth; first primary always distinctly longer than primary coverts. Wing-tip very much shorter than tarsus. Tail much more than half as long as wing. Feathers of fore part of crown not forming a crest. 2.
2. First primary reduced to a narrow, lanceolate feather, but little surpassing tip of primary coverts. Tail distinctly emarginate, about four-fifths of the wing (Palæarctic) 11. GENUS REMIZA.
- First primary well-developed, nearly half as long as second. 3.
3. Tail nearly as long as wing, slightly rounded. Culmen slightly decurved terminally (Nearctic) 13. GENUS AURIPARUS.
- Tail about three-fifths of wing, distinctly emarginate. Culmen not decurved terminally (Ethiopian) 12. GENUS ANTHOSCOPUS.

11. GENUS REMIZA STEJNEGER

Ægithalus (nec *Ægithalos* Hermann 1804!) Boie, Isis, 1822, p. 556 (part.).

Remiza Stejneger, Proc. U. S. Nat. Mus. Vol. 9, pp. 374, 387 (1886) (type: *Parus pendulinus* Linnæus).

Remizus Prazák, in Hennicke, Naumann's Vög. Mitteleur. Vol. 2, p. 240 (1897) (nom. emend.).

Remiz Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 474 (1907) (apparently proposed as a substitute of *Remiza* Stejneger).

Characters. Bill exceedingly slender, much shorter than head, with both culmen and gonys nearly straight; tip in most of the species acute, in *R. macronyx* and subspecies somewhat flattened. Nostrils lateral, very small, circular and entirely hidden by the antrorse, latero-frontal plumules. Rictal bristles obsolete or scarcely indicated. Wing rather long, rounded, first primary reduced to a narrow, lanceolate feather, in length equal to, or but little surpassing, the primary coverts; third and fourth primaries forming the tip, fifth hardly shorter; second primary falling between the sixth and seventh; secondaries long, about four-fifths of whole wing; wing-tip much shorter than tarsus. Tail slightly emarginate, distinctly shorter than the wing, the difference being about equal to length of bill. Tarsus relatively strong, covered in front with very distinctly separated scutes. Toes with strongly curved claws. Outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, to inner toe for its entire length; hallux about equal to inner toe, but much stouter.

Coloration. The majority of the species (nos. 1-8) have the upper back clear chestnut, shading into buff on lower back and rump and into buffy or greyish white on upper tail coverts. The upper wing coverts are either clear chestnut, cinnamon-rufous or isabelle, wing- and tail feathers dusky, broadly edged with hoary white. Forehead and sides of the head black, the crown exceedingly variable in coloration, varying from hoary white to chestnut; under parts white, more or less underlaid with cinnamon on chest, and washed with buff on abdomen. The five first forms are undoubtedly geographic races of the same type, and such is also very likely the case with *R. yeniseensis*. The Central-Asiatic subspecies differ from the Western ones by their much smaller, weaker bill. *R. pendulina jaxartensis* resembles, as far as coloration is concerned, the European *R. p. pendulina*, in having the lesser upper wing coverts cinnamon-rufous and the black frontal band followed by a narrow, rufous border, while in *R. p. stoliczkae* this line is altogether absent and the colour of the lesser wing coverts much paler, isabelle or cinnamon-buff. *R. yeniseensis*, of which only the immature plumage is known, shares the coloration of the wings with *R. p. stoliczkae*, but differs from the corresponding stage of the latter by the much broader and more distinct, buffy white frontal edge, loreal and superciliary streak. *R. macronyx* and allies (nos. 9-11) are somewhat aberrant both in coloration and structure. The bill is larger, flatter and less pointed, the feet are considerably stronger, the spurious primary is somewhat longer. In the adults, the whole head and sometimes even parts of the back and breast are black; however, the immature plumages closely resemble those of the typical forms.

Geographical Distribution. South-eastern Europe and temperate regions of Palæarctic Asia, in the east southwards to the Yangtze-kiang and to Southern Japan (Kiusiu).

Habits and Nidification. The members of this genus frequent the banks of rivers and lakes, and marshy places. The nest is usually built on thin twigs of willows, poplars, birches and other trees, often overhanging a river or swamp, but sometimes away from water. It is a beautiful structure of the down of willow catkins or other vegetable down, carefully woven together with stems and fibres; in shape it somewhat resembles a flask, completely domed and thickly woven at the bottom, with one or two openings. The eggs, from five to seven in number, are pure white, without gloss, of remarkably elongated shape, and measure from 14 to 18 by 10 to 11 mm. (Jourdain).

KEY TO THE SPECIES AND SUBSPECIES OF REMIZA ¹⁾

1. Head all round black, throat duller, more greyish black 2.
 — Forehead black, crown whitish, pale greyish, buff or chestnut. Sides of the head black 4.
 — No black whatever on forehead and sides of the head, except sometimes an indistinct small dusky patch on the lower portion of the ear coverts. 10.
 2. Black above mainly restricted to head and nape. Lower breast and abdomen paler, fulvous 3.
 — Black above extended over the greater part of the back. Lower breast and abdomen darker, clear chestnut 11. R. MACRONYX NIGRICANS ad.
 3. Larger : wing 55-60, tail 48-52 mm. 9. R. MACRONYX MACRONYX ad.
 — Smaller : wing 55-56, tail 46.5-51 mm. 10. R. MACRONYX NEGLECTUS ad.
 4. Feathers of the occiput largely black, this colour sometimes half-concealed by white tips, forming, together with the black sides of the head and forehead, a broad, more or less complete band encircling the white centre of the crown 7. R. CORONATA ad.
 — Feathers of the occiput only at the extreme base dark grey, their apical portions of the same colour as the crown 5.
 5. Pileum chestnut 2. R. PENDULINA CASPIA ad.
 — Pileum deep buff. } 9. R. MACRONYX MACRONYX semi ad.
 } 10. R. MACRONYX NEGLECTUS semi ad.
 } 11. R. MACRONYX NIGRICANS semi ad.
 — Pileum dingy whitish or pale greyish. 6.
 6. Black frontal band followed by a narrow, but distinct chestnut line. 7.
 — No chestnut line behind black frontal band 9.
 7. Chestnut line continued along upper margin of the black sides of head as far back as posterior end of ear coverts 2. R. PENDULINA CASPIA semi ad.
 — Chestnut line bordering black frontal band and continued to above the eye. 8.
 8. Bill much larger as well as longer : 10-12 mm. 1. R. PENDULINA PENDULINA ad.
 — Bill much smaller and shorter : 7.5-9 mm. 3. R. PENDULINA JAXARTENSIS ad.
 9. Pileum pale ashy with narrow, but distinct dusky shaft-lines. Wing longer : 55-57 mm. 5. R. PENDULINA CONSOBRINA ad.
 — Pileum uniform dingy white. Wing shorter : 52-54 mm. 4. R. PENDULINA STOLICZKÆ ad.
 10. Pileum darker, greyish brown. Feet stronger, bill very large, flattened towards the tip } 9. R. MACRONYX MACRONYX juv.
 } 10. R. MACRONYX NEGLECTUS juv.
 } 11. R. MACRONYX NIGRICANS juv.
 — Pileum paler, dull or greyish buff. Feet weaker, bill smaller, distinctly acute 11.
 11. Bill larger, longer : 10-11 mm. 1. R. PENDULINA PENDULINA juv.
 — Bill weaker and smaller : 7.5-9 mm. 12.
 12. Narrow frontal edge whitish, followed by a distinct chestnut line. Pale superciliary streak scarcely indicated 3. R. PENDULINA JAXARTENSIS juv.
 — Broad frontal band, lores, and a very distinct superciliary stripe buffy white. No chestnut line behind frontal band 6. R. YENISEENSIS juv.

1) R. ssaposhnikowi, unknown to the author, is not included in the key.

1. *Remiza pendulina pendulina* (Linnæus).

Motacilla Pendulinus Linnæus, Syst. Nat. ed. 10, p. 189 (1758) (« Habitat in Polonia, Lithuania, Hungaria, Italia, missa a DD. Montio »).

Parus narbonensis Gmelin, Syst. Nat. Vol. 1, II, p. 1014 (1789) (based on « La Penduline » Buffon, Hist. Nat. Ois. Vol. 5, p. 433, and Daubenton, Pl. Enl. 708, f. 1 : Languedoc, South France).

Pendulinus Polonicus Brehm, Handb. Naturg. Vög. Deutschl. p. 476 (1831) (« lebt in den Rohrwäldern Polens, selten an den rohrreichen See- und Flussumfern Deutschlands »).

Pendulinus medius Brehm, ibidem, p. 477 (1831) (« kommt bei Wien vor »).

Pendulinus macrourus (sic) Brehm, ibidem, p. 477 (1831) (« sie lebt an der Donau, zeigt sich auf der Wanderung in der Nähe von Wien »).

Parus minimus Gloger, Gemeinnütz. Hand- und Hilfsbuch Naturg. p. 281 (1842) (new name for *Motacilla Pendulinus* Linnæus).

Remizus pendulinus raddei Prazak, in Hennicke, Naumann's Naturg. Vög. Mitteleur. Vol. 2, p. 242 (1897) (South Europe [South Russia, Eastern Galicia]).

Fig. Dresser, Birds Europe, Vol. 3, pl. 116.

Hab. Southern Europe : eastern parts of Spain, southern France, Italy, the Plains of the Danube, westwards as far as Vienna (Austria), Hercegovina (Utovo Blato), Galicia, Poland, S. W. Russia (Poltawa etc.). Formerly breeding at various localities in Germany, nowadays only sparingly to be met with in Silesia.

2. *Remiza pendulina caspia* (Poelzsch). (Pl. 2, Fig. 3.)

Ægithalus caspius Poelzsch, Protok. Kazan. Univ. Vol. 1, p. 141 (1870) (Astrakhan).

Ægithalus castaneus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 136 (1873) (Astrakhan); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 104 (transl.).

Ægithalus galliardi d'Hamonville, Cat. Ois. Europe, p. 38 (1876) (based on *Ægithalus* sp. Olphe-Galliard, The Ibis (3), Vol. 5, 1875, pp. 268, 269 : « Russie méridionale »).

Fig. Dresser, Birds Europe, Vol. 3, pl. 117.

Hab. Delta of the Volga (Astrakhan) and the countries on the northern shore of the Caspian Sea, northwards as far as Orenburg.

3. *Remiza pendulina jaxartensis* Sushkin.

Ægithalus pendulinus var. *jaxartica* Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 135, pl. 9, f. 2 (1873) (no description, plate uncoloured and not recognizable : hence nomen nudum).

Remiza pendulina jaxartensis Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 45 (1904) (« Turkestan »; the types, examined by me, are from Tshinaz on the Syr-Darja).

Hab. West Turkestan : valley of the Syr-Darja (Tshinaz, Perovsk).

4. *Remiza pendulina stoliczkae* (Hume).

Ægithalus stoliczkae Hume, Stray Feath. Vol. 2, p. 521 (1874) (No locality. Terra typica is : Bora south of Kashgar, Eastern Turkestan. Type in Brit. Mus. examined).

Remiza pendulina centralasiae Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 45 (1904) (« Asia centralis », Terra typica is : Sa-tchou, in S. E. Mongolia. Types in St. Petersburg Museum examined).

Fig. Scient. Res. Sec. Yarkand Miss. Aves, pl. 7; Bianchi, Aves Przewalsk. Livr. 4, 1905, pl. 10, ff. 1, 2.

Hab. East Turkestan (Kashgar, Nija- and Tjertjen Darja, Sa-tchu), Dsungaria (R. Urungu, Bulugun, Bulun-tochoi) and Mongolia (Urot).

5. *Remiza pendulina consobrina* (Swinhoe) 1).

Ægithalus consobrinus Swinhoe, Proc. Zool. Soc. Lond. 1870 p. 133 (1870) (Sha-shi on the Yangtzekiang, below Ichang, China. Type in Brit. Mus. examined).

Remiz consobrinus suffusus Clark, Proc. U. S. Nat. Mus. Vol. 32, p. 474 (1907) (Fusan, Corea).

Remiz consobrinus japonicus Clark, ibidem, p. 475 (1907) (Japan).

Fig. Gould, Birds Asia, Vol. 2, pl. 70.

Hab. Middle China : Valley of the Yangtzekiang; Corea (Fusan); South Japan : Kiu-siu (Nagasaki).

1) Mr. Clark (loc. cit.) separates the Corean- and Japanese representatives from the typical Chinese *R. p. consobrina*. Adult ♂♂ from Nagasaki (British and St. Petersburg Museum) I cannot distinguish from Swinhoe's type, either in size or coloration. Although I have not seen the Corean bird, its distinctness appears scarcely possible in view of the fact that examples from Kiusiu (Nagasaki) and China prove to be identical.

6. *Remiza yeniseensis* Sushkin.

Remiza yeniseensis Sushkin, Bull. Brit. Ornith. Club, Vol. 14, p. 44 (1904) (« Mongolia septentrionalis pars inter juga Sayan et Tannu-ola posita, ad cursum superiorem fluminis Yenisei »; type examined).

Hab. Central Siberia : Upper Yenisey (Kemtchik River, Mount Chaircham).

Obs. Doubtful form. If anything it will prove to be a geographical race of *R. pendulina*. No adult males are known; the types — immature ♂♂ — differ from the corresponding plumage of *R. p. javartensis*, with which they share the shortness of the bill and general coloration, by lacking the chestnut line behind the whitish frontal band.

7. *Remiza coronata* (Severtzow).

Ægithalus coronatus Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 136, pl. 9, f. 3 (1873) (Naw near Chodjent, on the Syr-Darja, Samarkand); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 103 (transl.).

Ægithalus atricapillus Severtzow, ibidem, p. 137, pl. 9, ff. 4, 5 (1873) (Syr-Darja near Perowsk; also near Djimkent and in the Oigoum Mountains, not far from Tashkent); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 105 (transl.).

Hab. Transcaspia (Tedshen, Merw), West Turkestan (Guldja, north of the Alai Range, Amu Darja, Syr-Darja, Sarafshan), south to adjoining parts of Afghanistan and Eastern Persia; in winter migrating as far southwards as Kohât and Sindh in Western India.

8. *Remiza ssaposhnikowi* (Johansen).

Anthoscopus ssaposhnikowi Johansen, Ornith. Jahrb. Vol. 18, p. 201 (1907) (Shore of Lake Balkash, west of the River Karatal).

Fig. Johansen, Vögel des Siebenstromgebietes und Turkestans, gesammelt von der Exped. des Prof. W. W. Ssaposhnikow im Jahre 1902 Tomsk, 1908, pl. 1.

Hab. South shore of Lake Balkash, west of the River Karatal.

Obs. This little-known form requires further confirmation. According to Johansen it agrees in the length of the spurious (first) primary with *R. macronyx*, but differs widely in coloration : having only the forehead and sides of the head black, the pileum chestnut, the nape and lower back buff, the interscapulum cinnamon-rufous, the throat white, rest of under parts pale buff, shaded with pink on the chest. It would thus seem to be very similar to *R. p. caspia* in coloration, still it may turn out to represent a stage of the next form.

9. *Remiza macronyx macronyx* (Severtzow).

Ægithalus macronyx Severtzow, Izv. Obshch. Moskov. Vol. 8, no. 2, p. 137, pl. 9, f. 8 (1873) (Djimkent, Syr-Darja); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 106 (transl.).

Ægithalus rutilans Severtzow, ibidem, p. 137, pl. 9, ff. 6, 7 (*A. rutilans* var. *cucullata* and var. *pectoralis* on the plate) (1873) (Djimkent, Syr-Darja); Zeitschr. ges. Ornith. Vol. 4, 1887, p. 107 (transl.).

Hab. West Turkestan : valleys of the Syr- and Amu-Darja.

10. *Remiza macronyx neglecta* (Sarudny).

Anthoscopus rutilans neglectus Sarudny, Ornith. Monatsber. Vol. 16, p. 163 (1908) (Reeds of the south shore of the Caspian Sea).

Hab. Reeds of the south shore of the Caspian Sea near Lenkoran, and in the provinces of Ghilan, Mazanderan and Asterabad, Northern Persia.

11. *Remiza macronyx nigricans* (Sarudny).

Anthoscopus rutilans nigricans Sarudny, Ornith. Monatsber. Vol. 16, p. 162 (1908) (Seistan, East Persia).

Hab. Reeds of the Hilmend River, Lakes Chamoon-i-Suwaran and Chamoon-i-Farrakh etc. in Seistan, Eastern Persia.

12. GENUS ANTHOSCOPIUS CABANIS

Anthoscopus Cabanis, Mus. Heinean. Vol. 1, p. 89 (1851) (sp. typ. : *Sylvia minuta* Shaw),

Characters. Bill much shorter than head, with acute tip; culmen rounded, nearly straight, but little decurved terminally; gonys straight. Nostrils small, roundish, completely hidden by dense, antrorse latero-frontal plumules. No rictal bristles. Wing relatively long, rather rounded, third, fourth and fifth primaries longest, sixth somewhat shorter, but much longer than second;

first primary well developed, though rather narrower than the other primaries, about half as long as second. Tail much shorter than wing, slightly emarginate. Tarsus rather strong, decidedly longer than middle toe with claw; acrotarsium conspicuously scutellate; middle toe longest, inner toe slightly shorter than outer one; hallux intermediate in length between lateral toes, but much stouter. The structure of the feet is exactly as in *Remiza*, further details being, therefore, unnecessary. Wing 50-56, tail 30-38 mm.

Coloration. Above plain olive-grey, olive-green or yellowish green, forehead sometimes bright yellow, sometimes washed with pale ochraceous, in most species obsoletely or distinctly spotted or punctulated with dusky. Under parts whitish, yellow or ochraceous, throat and chest in several species conspicuously paler than lower belly. Bill and feet blackish or dusky.

Geographical Distribution. Tropical Africa (Ethiopian Region). Thirteen forms are at present known.

Habits and Nidification exactly as in *Remiza*.

Observations. This genus, while closely allied to the Palæarctic Penduline Tits (*Remiza*), differs by its relatively shorter tail and by having a well-developed and much longer first primary. Besides, the style of coloration is very different in the two genera.

KEY TO THE SPECIES AND SUBSPECIES OF ANTHOSCOPUS

1. Under parts with some isabelle or ochraceous buff, either the whole lower surface (except throat) or lower abdomen and under tail coverts being of that colour. Upper parts greyish. 2.
- Under parts never isabelle or ochraceous buff, being either whitish or yellow. 6.
2. Throat, foreneck and chest white, shading gradually into ochraceous-buff on belly and under tail coverts 3.
- Whole under surface nearly uniform isabelle-colour, only on upper throat passing into buffy white 5.
3. Upper tail coverts pale brownish grey like back. Isabelle-colour of belly paler and more restricted to anal region 10. *A. MUSCULUS*.
- Upper tail coverts distinctly washed with ochraceous-buff. Lower breast, abdomen and under tail coverts ochraceous-buff 4.
4. Upper parts sandy grey. Axillaries and under wing coverts creamy buff. 6. *A. CAROLI CAROLI*.
- Upper parts clear brownish grey. Axillaries and under wing coverts pure white. 7. *A. CAROLI ROBERTSI*.
5. Upper parts, including rump and upper tail coverts, purely ashy grey, forehead decidedly washed with ochraceous. Under parts paler. Wing 51,5 mm. 8. *A. CAROLI ROTHSCILDI*.
- Upper parts olivaceous-grey, forehead barely, rump and upper tail coverts distinctly shaded with ochraceous. Under parts deeper. Wing 55-59 mm. 9. *A. CAROLI SYLVIELLA*.
6. Forehead more or less brightly yellow, with or without dusky apical spots to the feathers 9.
- Feathers of forehead black edged or punctulated with white at tip. 7.
7. Breast and abdomen darker, dull ochreous-yellow; upper parts dark ashy, on rump and upper tail coverts olivaceous. 1. *A. MINUTUS MINUTUS*.
- Breast and abdomen light sulphur-yellow; upper parts clear olivaceous-grey. 8.
8. Upper parts more washed with olive 2. *A. MINUTUS SMITHII*.

- *Upper parts more purely grey* 3. *A. MINUTUS DAMARENSIS*.
 9. *Bill more powerful, stouter, longer : 9 mm. or more. Wing 54 mm. or more.* 10.
 — *Bill slender, weak, shorter : 8 mm. or less. Wing not more than 52 mm.* 11.
 10. *Under parts pale dingy yellow.* 11. *A. FLAVIFRONS*.
 — *Under parts dirty white, without any yellow.* 12. *A. ANSORGEI*.
 11. *Forehead with distinct blackish spots* 12.
 — *Forehead with scarcely traces of minute, greyish apical spots; head above and back bright olive-green; under parts pale yellowish* 4. *A. ROCCATII*.
 12. *Upper parts greyish olive-green; under parts white, flanks shaded with pale greyish.* 5. *A. PUNCTIFRONS*.
 — *Upper parts bright yellowish green; under parts uniform pale lemon-yellow.* 13. *A. PARVULUS*.

1. ***Anthoscopus minutus minutus*** (Shaw & Nodder) 1).

Sylvia minuta Shaw & Nodder, Natur. Miscell. Vol. 23, pl. 997 (1812) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 134, ff. 1, 2 : « Le Figuier Becque Fleur », « aux environs du Heere-Logement, et de là jusqu'à la Rivière-des-Eléphants », i. e. Cape Colony).

Phyllopneste antophila Boie, Isis, Vol. 21, p. 321 (1828) (based on Levaillant, Ois. d'Afr. Vol. 3, pl. 134, ff. 1, 2).

A[ntoscopus] m[inutus] levaillanti Reichenow, Vög. Afr. Vol. 3, p. 526 (1905) (new name for *A. minutus* apud Sharpe, The Ibis (8), Vol. 4, 1904, pl. 8, f. 1).

Fig. The Ibis (8), Vol. 4, 1904, pl. 8, f. 1.

Hab. South Africa : Cape Colony (Oliphant's River, Deelfontein, Kingwilliamstown, Port Elizabeth, Nel's Port etc.).

2. ***Anthoscopus minutus smithii*** (Jardine).

Ægithalus Smithii Jardine, Edinb. Journ. Nat. Geogr. Sc. Vol. 3, p. 212, pl. 5, f. 1 (1831) (South Africa, type collected by Dr. A. Smith).

Fig. Gadow, Cat. Birds Brit. Mus. Vol. 8, pl. 1, f. 2; Sharpe, The Ibis (8), Vol. 4, 1904, pl. 8, f. 2.

Hab. South-eastern Africa : Transvaal, from Potchefstroom and Rustenburg northwards to Mashonaland.

3. ***Anthoscopus minutus damarensis*** Reichenow.

A[ntoscopus] m[inutus] damarensis Reichenow, Vög. Afr. Vol. 3, p. 526, in text (1905) (Damaraland, no type locality specified).

Hab. S. W. Africa : Damaraland, north to Mossamedes (Huxé).

4. ***Anthoscopus roccatii*** Salvadori 2).

Anthoscopus Roccatii Salvadori, Boll. Mus. Zool. Anat. Comp. Torino, Vol. 21, no. 542, p. 2 (1906) (Entebbe, Uganda).

Fig. Trans. Zool. Soc. Vol. 19, pl. 13, f. 2

Hab. British East Africa, Uganda Protectorate : Entebbe (north shore of Victoria Nyansa) and Mokia (south-eastern slope of Mount Ruwenzori).

5. ***Anthoscopus punctifrons*** (Sundevall).

Ægithalus punctifrons Sundevall, Oefv. Vet. Akad. Förh. Vol. 7, no. 5, p. 129 (1850) (Sennaar).

Hab. North-east Africa : on the Upper White Nile (Khartum, Shendi, Jebel-Ahmed-Agha, Goz-Abu-Gumar); also recorded from « Sennar » and « Abyssinia ».

6. ***Anthoscopus caroli caroli*** (Sharpe).

Ægithalus caroli Sharpe, The Ibis (3), Vol. 1, p. 415 (1871) (Ovaquenyama, Damara Land).

Fig. Cat. Birds Brit. Mus. Vol. 8, pl. 1, f. 1.

Hab. S. W. Africa (Damaraland). [The records from Swaziland, N. E. Rhodesia and Karonga (Nyasa-land) are most certainly referable to the following subspecies.]

1) Although Levaillant's figure leaves much to desire yet the explicit statement that he met with the species only in the localities given above enables us to strictly refer the name *minutus* to the form of the Cape Colony.

2) This species I have not seen. Mr. Ogilvie-Grant, however, informs me that the British Museum possesses a series from Mokia, S. E. Ruwenzori, and has favoured me with the following note : « In the colour of the under parts *A. roccatii* is intermediate between *A. punctifrons* and *A. capensis* (i. e. *A. minutus smithii*). On the upper surface it is darker olive-green than *A. punctifrons*. From both species it is very easily distinguished by having the fore part of the forehead yellow and with scarcely a trace of the black spots characteristic of both *A. punctifrons* and *A. capensis*. »

7. *Anthoscopus caroli robertsi* Haagner.

Anthoscopus robertsi Haagner, Ann. Transvaal Mus. Vol. 1, no. 4, p. 234 (1909) (Villa Pereira, Boror District, Portuguese East Africa).

Hab. S. E. Africa : Boror district, north of the Zambezi, Portuguese East Africa. Apparently also in Eastern Transvaal (= Swaziland : Lijdenburg), North-east Rhodesia (Salisbury, Ganyani R.), and North Nyasaland (Karonga).

8. *Anthoscopus caroli rothschildi* Neumann.

Anthoscopus rothschildi Neumann, Journ. f. Ornith. Vol. 55, p. 597 (1907) (Simba, Brit. East Africa).

Hab. Southern British East Africa : Simba in Ukamba province.

9. *Anthoscopus caroli sylvielli* Reichenow.

Anthoscopus sylvielli Reichenow, Ornith. Monatsber. Vol. 12, p. 27 (1904) (Malangali in Usafua).

Anthoscopus sharpei Hartert, Bull. Brit. Ornith. Club, Vol. 15, p. 75 (1905) (Usambiró, south of Victoria Nyanza; type examined).

Anthoscopus colomanni Madarasz, Archiv. Zool. Vol. 1, p. 177 (1910) (Ngare-Dowash).

Fig. Reichenow, Vög. Afrikas, Vol. 3, pl. [23], f. 1.

Hab. German East Africa : Usafua, Usambiró, Ngare Dowash.

10. *Anthoscopus musculus* (Hartlaub).

Ægithalus musculus Hartlaub, Ornith. Centralbl. Vol. 7, p. 91 (1882) (Ladó).

Fig. Shelley, Birds Africa, Vol. 2, 1900, pl. 11, f. 2.

Hab. Eastern Africa : from Southern Somaliland (Djambdjam, Damaso, Anole, Haud etc.) and South Ethiopia (Hawasch) to the upper White Nile (Ladó) and the Kilimandjaro District (Taweta, Ndjiri).

11. *Anthoscopus flavifrons* (Cassin).

Ægithalus flavifrons Cassin, Proc. Acad. Nat. Sc. Philad. Vol. 7, 1854, p. 325 (1855) (Moonda River, Gaboon).

Rhaphidornis flavifrons Reichenow, Ornith. Monatsber. Vol. 5, p. 123 (1897) (Bipinde, Cameroons).

Ægithalus cameroonensis Shelley, Birds Africa, Vol. 2, p. 251 (1900) (Bipinde, Cameroons).

Fig. Proc. Acad. Nat. Sc. Philad. 1858, pl. 1, f. 2.

Hab. Western Africa : Gaboon, Cameroons.

12. *Anthoscopus ansorgei* Hartert. (Pl. 3, Fig. 5.)

Anthoscopus ansorgei Hartert, Bull. Brit. Ornith. Club, Vol. 15, p. 74 (1905) (Mangonga River, Benguella).

Hab. S. W. Africa : Angola (Bihé, Benguella, Caconda).

13. *Anthoscopus parvulus* (Heuglin).

Ægithalus ? parvulus Heuglin, Journ. f. Ornith. Vol. 12, p. 260 (1864) (« in der Waldregion in Bongo »).

? *Ægithalus calotropophilus* Rochebrune, Bull. Soc. Philom. Paris (7). Vol. 7, p. 166 (1883) (Senegambia); Faune Sèneg. Oiseaux, 1884, p. 188, pl. 16.

Fig. Hartlaub, Zool. Jahrb. Vol. 2, 1887, pl. 12, f. 3.

Hab. Only known from Senegambia (St. Louis) and the Upper White Nile (Bongo, Redjaf, Kiri).

13. GENUS AURIPARUS BAIRD

Auriparus Baird, Review Amer. Birds, p. 85 (1864) (type : *Ægithalus flaviceps* Sundevall).

Characters. Bill much shorter than head, with nearly straight outlines and acute tip; culmen very faintly curved terminally. Nostrils as in *Remiza*. Rictal bristles obsolete. Wing relatively long, but rounded; third, fourth and fifth primaries longest; second primary equal to, or longer than, seventh; first (spurious) primary, though small and narrow, much longer than in *Remiza*, about half as long as second. Tail somewhat shorter than the wing, slightly

rounded, not emarginate as in *Remiza*. Tarsus about twice as long as culmen, decidedly longer than middle toe with claw; acrotarsium distinctly scutellate. Outer toe slightly longer than inner one; basal phalanx of middle toe adherent to outer toe for more than half of its length, entirely adherent to inner toe.

Coloration. Above dingy grey, below uniform greyish white. Adult birds with the top and sides of the head olive- or gamboge-yellow, brighter on forehead, duller on occiput; and lesser upper wing coverts clear chestnut-rufous.

Geographical Distribution. South-western districts of United States and northern states of Mexico.

Habits and Nidification. Resembles in habits and nidification the Palæarctic Penduline Tits (*Remiza*). The nest, a bulky globular or retort-shaped structure of thorny twigs, with entrance a small hole in side, is placed among twigs of thorny trees and bushes. The eggs are pale greenish blue, speckled with reddish brown, hence different from those of *Remiza*.

KEY TO THE SUBSPECIES OF AURIPARUS

1. *Larger* : wing ♂ 50-55, ♀ 49-53; tail ♂ 46-50, ♀ 43.5-48 mm.
Yellow of head duller in adults. Young with upper parts uniform greyish brown, abdomen and under tail coverts whitish 1. *A. FLAVICEPS FLAVICEPS*³
2. *Smaller* : wing ♂ 48.5-52, ♀ 47-51; tail ♂ 39.5-44, ♀ 39-44 mm.
Yellow of head brighter in adults. Young with upper parts strongly olivaceous, abdomen and under tail coverts olive yellowish 2. *A. FLAVICEPS LAMPROCEPHALUS*.

1. *Auriparus flaviceps flaviceps* (Sundevall). (Pl. 2, Fig. 4.)

Ægithalus flaviceps Sundevall, Oefv. Vet. Akad. Förh. Stockholm, Vol. 7, n° 5, p. 129 (1850) (« Sitka vel California »)
Conirostrum ornatum Lawrence, Ann. Lyc. Nat. Hist. New York, Vol. 5, p. 112, pl. 5, f. 1 (1852) (Rio Grande, Texas).

Fig. Ann. Lyc. Nat. Hist. New York, Vol. 5, pl. 5, f. 1.

Hab. Southern Texas, New Mexico, Arizona, S. W. Utah, S. Nevada, and S. California; Northern Lower California; also in Mexican States of Sonora, Chihuahua, Durango, Coahuila, Nuevo Leon and Tamaulipas.

2. *Auriparus flaviceps lamprocephalus* Oberholser.

Auriparus flaviceps ornatus (nec *C. ornatum* Lawrence 1852; W. E. Bryant, Zool. Vol. 1, p. 149 (1890) (part. : Lower California).

Auriparus flaviceps lamprocephalus Oberholser, Auk, Vol. 14, p. 391 (1897) (same locality).

Hab. Cape St. Lucas district of Lower California and opposite parts of Southern Sonora (Guaymas, Alamos etc.).

14. GENUS CEPHALOPYRUS BONAPARTE

Cephalopyrus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 38, p. 62 (1854) (sp. typ. : *Parus flammiceps* Burton).

Characters. Bill slender, much shorter than head, with both culmen and gonys nearly straight, culmen above rounded, and with acute tip. Nostrils basal, round, very large (much larger than in the other genera of the subfamily), entirely exposed (not hidden by antrorse,

latero-frontal plumules). Rictal bristles obsolete. Wing rather long, pointed; third and fourth primaries equal and longest; second and fifth but slightly shorter; first primary obsolete, being reduced to a minute, lanceolate feather, scarcely half as long as primary coverts; secondaries short, somewhat less than two-thirds of whole wing; wing-tip very much longer than tarsus. Tail even, extremely short, about half as long as wing, rectrices broad, with rounded tip. Tarsus longer than exposed culmen, but much less than twice its length; acrotarsium distinctly scutellate; proportion of toes as in *Remiza*; claws rather shorter and more slender than in the last-named genus. Wing 60-62, tail 30-34 mm. Feathers of forehead conspicuously elongated, slightly stiffened, forming, together with the likewise lengthened, but not stiffened feathers of the crown, a distinct, erect crest.

Coloration. Erect feathers of forehead and fore part of crown, as well as lores bright fiery orange-red; rest of pileum and back light yellowish olive-green, more yellowish on rump and upper tail coverts; wing coverts and quills dusky, broadly edged with dull olive-yellowish; rectrices dusky, with narrow, pale yellowish margins. Sides of head, throat, foreneck and chest bright golden yellow, washed with reddish orange on chin, passing into clear yellow on belly, and to buff on anal region. The females and young birds lack the fiery red forehead and are more greenish on the back, with chin and throat duller, greenish yellow, and belly paler yellow. Bill and feet horn-colour.

Geographical Distribution. Himalayas and adjoining parts of Afghanistan.

Habits and Nidification. Very little is known regarding its habits. It is said to nest in holes of trees and to lay uniform dark blue eggs! If there is no mistake about this subject the species would radically differ in that respect from all other members of the subfamily.

1. *Cephalopyrus flammiceps* (Burton).

Ægithalus flammiceps Burton, Proc. Zool. Soc. Lond. Vol. 3, 1835, p. 153 (1836) («apud montes Himalayenses»).
Dicoeum sanguinifrons (A. Hay MS.) Blyth, Journ. Asiat. Soc. Bengal, Vol. 15, p. 44 (1846) («neighbourhood of Simla »).

Fig. Gould, Birds Asia, Vol. 2, pl. 71; Contrib. Ornith. 1850, pl. 66, fig. inf.

Hab. Himalayas, from Gilgit and Murree to Bhutan, and adjoining parts of Afghanistan, at elevations of from 3000 to 9000 feet. In winter descending to the plains of India (Cawnpore, Etawah, Aligarh, Raipur, Nâgpur, Sangor etc.).

4. SUBFAM PARADOXORNITHINÆ

THE CROW-TITS

Characters. Bill much shorter than the head, either equal to, or slightly longer than, inner toe (without claw), very much compressed, being much deeper than broad, sometimes even deeper than long (*Paradoxornis*), with outlines strongly convex; culmen rounded above, sometimes excessively so, strongly curved for its entire length; maxillary and mandibular tomiae more or less distinctly sinuated; gonys abruptly ascending terminally. Rictal bristles obvious, though not very numerous. Nostrils very small, nearly circular, completely concealed by setose, antrorse latero-frontal plumules. Wing of moderate length, about three times as long as tarsus,

rounded; fourth to seventh primaries longest; third primary conspicuously shorter, about equal to eighth or ninth, second equal to secondaries; first primary well-developed, much more than half as long as second. Tail very variable as to relative length, either longer or shorter than the wing, rounded or graduated. Tarsus strong, much more than twice as long as middle toe (without claw); acrotarsium scutellate, the scutes rarely fused into a single lamina; middle toe longest, outer toe slightly longer than inner one; basal phalanx of middle toe united to inner toe for entire length, to outer toe for about half its length; hallux about equal to inner toe, but much stouter, its claw much shorter than the digit, more strongly arched than claws of anterior toes. Plumage remarkably soft and copious. Sexes alike, young very little different from adults, not spotted nor streaked.

Geographical Distribution. Southern and Eastern Asia. Mostly Indo-Malayan, but a few species extend their range into the Palæarctic Region. Six genera with about thirty-five species and subspecies.

Habits. The Crow-Tits are reported to resemble the Titmice in habits and food. About their nidification very little is yet known. The few species whose breeding-habits have been described build an open, cup-shaped nest of dry stems of grasses, branches, bamboo-leaves etc. in bushes or trees, and lay three eggs which are either uniform blue or spotted and blotched with brownish and grey on a white ground colour.

Bibliography. Oates, Fauna Brit. India, Birds, Vol. I, 1889, pp. 60 ff.

KEY TO THE GENERA OF PARADOXORNITHINÆ

- | | |
|---|-------------------------|
| 1. Outer toe abortive, reduced to a short, clawless stump | 16. Genus CHOLORNIS. |
| — Outer toe normal | 2. |
| 2. Tail decidedly longer than the wing | 3. |
| — Tail decidedly shorter than the wing | 5. |
| 3. Tail slightly graduated, the outermost tail-feather being about 10 mm. shorter than the longest. Bill longer, less convex, gonys but slightly ascending.
Larger : wing 120 mm. and more. | 20. Genus CONOSTOMA. |
| — Tail much graduated, the outermost tail feather being half as long as the central (longest) one. Bill shorter, more elevated. Smaller : wing never exceeding 100 mm. | 4. |
| 4. Bill deeper than long. Cutting edge of upper mandible with a strong sigmoid curve | 15. Genus PARADOXORNIS. |
| — Bill not deeper than long. Cutting edge of upper mandible without or with merely slight indication of sigmoid curve | 17. Genus SUTHORA. |
| 5. Larger : wing more than 80 mm. Culmen strongly convex, somewhat elevated, slightly rounded above; mandible with terminal half of gonys slightly ascending | 19. Genus PSITTIPARUS. |
| — Smaller : wing not more than 55 mm. Culmen much less convex, with the mesorhinium much broadened and flattened; mandible swollen, with basal half of gonys nearly straight, its terminal half abruptly turned upward, almost in a vertical line | 18. Genus NEOSUTHORA. |

15. GENUS PARADOXORNIS GOULD

Paradoxornis Gould, Proc. Zool. Soc. Lond. Vol. 4, p. 17 (1836) (sp. un. : *Paradoxornis flavirostris* Gould).

Bathyrhynchus McClelland, Quart. Journ. Calcutta Soc. no. 4, p. 531 (1837) (sp. un. : *B. brevirostris* McClelland).

Anacrites Gistel, Naturg. Thierr. p. 10 (1848) (new name for *Paradoxornis* Gould).

Calamornis (subgenus) Gould, Birds Asia, Vol. 3, p. 73 (1874) (sp. un. : *Paradoxornis heudei* David).

Characters. Bill much compressed laterally, decidedly deeper than long; culmen, from the base to the tip, strongly curved, ending in an acute point; cutting edge of upper mandible with a deep sigmoid curve to which corresponds a distinct sinuation in the lower mandible, the latter being somewhat swollen, with the apical half rather abruptly ascending. Nostrils very small, circular and completely hidden by the dense nasal plumules. Wing short and much rounded, its tip being formed by the fourth, fifth and sixth primaries; first primary considerably more than half as long as second. Secondaries well developed, more than five-sixth of the total length of the wing. Tail very much graduated and much longer than the wing. Metatarsus covered in front with scutes, exceeding twice the length of hind toe without claw. Claws strong, distinctly curved. Plumage exceedingly soft and copious, the feathers of the hindneck especially so. Sexes alike.

Coloration. The two typical species, *P. flavirostris* and *P. guttaticollis*, have the top of the head and nape rufous-brown, the remaining upper parts brown, the quills dusky with rufescent brown edges, the tail pale brown. There is more or less black on the chin, the throat is either banded with black and white (*P. flavirostris*) or uniform whitish, resp. sandy buff (*P. guttaticollis*); rest of lower parts fulvous-brown, paler in the middle of belly, chest in *P. flavirostris* blackish. *P. heudei*, which may be not strictly congeneric with those two species, differs very markedly in coloration. Forehead and middle of crown are light grey, bordered laterally by a blackish stripe from the bill to the nape. Sides of the head ashy white. Nape and upper back light grey, washed with pale vinaceous; lower back and upper tail coverts bright fulvous-brown. Quills blackish, edged with light chestnut and buffy white. Outermost rectrix white, the central one pale fulvous, the remaining ones black, with the tip of the outer web greyish, and that of the inner web white. Chin and throat white, foreneck rosy or pale vinaceous, remainder of belly pale fulvous, shading into chestnut on sides of breast. Besides, *P. heudei* has the tail very much longer and more graduated, so that the recognition of a genus *Calamornis* might be justifiable.

Geographical Distribution. The species of *Paradoxornis* are found in Northern India (Eastern Himalayas, Assam) and Western and Southern China.

Habits and Nidification. Very little is known regarding their habits and nidification. They are said to frequent thickets of reeds and to feed on insects. *P. flavirostris* builds an open, cup-shaped nest, its eggs are described by Mr. C. C. Stuart Baker as white spotted and blotched with brownish and grey.

KEY TO THE SPECIES OF PARADOXORNIS

1. Head above light ashy grey, along the sides of the head a black stripe; outer tail feathers with a white apical patch. 1. *P. HEUDEI*.

- *Head above rufous brown; outer tail feathers without white markings* 2.
 2. *Chin black, throat barred with black and white; a broad black band across the chest.* 2. *P. FLAVIROSTRIS.*
 — *Chin black, throat dingy white, lower throat and chest washed with sandy buff; jugulum*
with a few, narrow, arrow-head-shaped black marks 3. *P. GUTTATICOLLIS.*

1. ***Paradoxornis heudei* A. David. (Pl 3, Fig. 2.)**

Paradoxornis Heudei A. David, Compt. Rend. Acad. Sc. Paris, Vol. 74, p. 1450 (1872) (Nanking, Lower Yangtsze-kiang).
 Fig. Nouv. Arch. Mus. Paris, Vol. 9, Bull. pl. 4, f. 2; David & Oustalet, Ois. Chine, pl. 63.
 Hab. Inhabits the reeds of the Lower Yangtsze-kiang near Nanking, Eastern China.

2. ***Paradoxornis flavirostris* Gould 1).**

Paradoxornis flavirostris Gould, Proc. Zool. Soc. Lond. Vol. 4, p. 17 (1836) (« in Nepaliâ »).
Bathyrhynchus brevirostris McClelland, Quart. Journ. Calcutta Soc. no. 4, p. 531, with plate, f. 1 (Dec. 1837) (Assam).
 Fig. Gould, Birds Asia, Vol. 3, pl. 75.
 Hab. Eastern Himalaya (from Nepal to Bhutan); also in the Khasia-, Shillong- and Naga Hills and Cachar, in Upper Assam; south of the Brahmaputra River.

3. ***Paradoxornis guttaticollis* A. David 1).**

Paradoxornis guttaticollis A. David, Nouv. Arch. Mus. Paris, Vol. 7, Bull. p. 14 (1871) (Szechuen and Mupin, W. China).
Paradoxornis Austeni Gould, Birds Asia, Vol. 3, pl. 73 (1874) (Assam, Kuchai-, Naga- and Shillong Hills).
 Fig. David & Oustalet, Ois. Chine, pl. 64.
 Hab. Western- and Southern China (Szechuen, Kansu, Fohkien); Assam; hilly districts south of the Brahmaputra River (Khasia-, Shillong-, Naga Hills, Sylhet), southwards to Loi Moheng, in the southern Shan States, South Burma. Lives in the mountains at altitudes of 4000 feet and more.

16. GENUS CHOLORNIS J. VERREAUX

Cholornis J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, 1870, Bull. p. 35 (sp. un. : *C. paradoxa*, J. Verreaux); ibidem, Vol. 7, 1871, Bull. p. 33 (detailed description).

Characters. Bill short, deep, laterally much compressed; culmen strongly convex, ending in a sharp point; lower edge of upper mandible without any trace of sigmoid curve; gonys strongly ascending in apical half. Nostrils very small, circular and completely hidden by dense, bristle-like plumes. At the base of the bill a number of rather stiffened rictal bristles. Wing less rounded than in the other genera of the subfamily, with the fifth and sixth primaries forming the tip; first primary somewhat longer than half the second. Tail strongly graduated and considerably longer than the wing. Acrotarsium covered with distinct scutes. Toes long and robust, with moderately curved claws; outer toe abortive, reduced to a short clawless stump, adherent to the middle toe for less than half of its length. Plumage exceedingly soft and copious, especially on the back. Feathers of the pileum somewhat lengthened, so as to form a slight crest.

Coloration. Top of the head greyish brown, forehead rather paler, inclining to white brown. Lores and a broad stripe above the eye and ear coverts as far back as the sides of the nape dark brown. A rim round the eye white. Sides of the head pale brown, shaded with vinaceous and streaked with dingy whitish. Back pale reddish brown, here and there washed

1) Although one feels tempted to consider the two species as mere geographical representatives, such does not appear to be the case, for they occur side by side in the Khasia- and Naga Hills. I have examined several specimens of both from this district in the British Museum.

with ashy. Quills greyish brown, outwardly margined with rufescent brown. Rectrices dull greyish brown, with the shafts pale rufescent brown. Chin and upper throat dark brown with paler edges; remaining under parts pale greyish brown, the centre of abdomen purer greyish, the flanks darker brownish. Bill yellow, eye whitish. Sexes alike. Wing 92-96, tail 105-115, bill 14 mm.

Geographical Distribution. Mountains of Western China (Moupin, Kansu).

Habits. According to A. David this remarkable bird, in its habits, closely resembles the species of the genus *Suthora*.

1. ***Cholornis paradoxa*** J. Verreaux. (Pl. 2, Fig. 5.)

Cholornis paradoxa J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) («Montagnes du Thibet chinois», sc. Moupin, W. China; cfr. J. Verreaux, ibidem, Vol. 7, 1871, p. 34).

Fig. Nouv. Arch. Mus. Paris, Vol. 7, pl. 1, f. 1; David & Oustalet, Ois. Chine, pl. 62.

Hab. Mountains of Western China.

17. GENUS SUTHORA HODGSON

Suthora Hodgson, Ind. Review, Vol. 2, p. 32 (1838) (sp. un. : *Suthora nipalensis* Hodgson).

Temnoris Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 1, p. 29 (1841) (new name for *Suthora* Hodgson).

Heteromorpha (nec Kirby 1825, *Coleoptera* !) Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, p. 448 (1843) (sp. un. : *Heteromorpha unicolor* Hodgson).

Chleuasicus Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, 11, p. 578 (1845) (sp. un. : *Chleuasicus ruficeps* Blyth).

Hemirhynchus Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (new name for *Temnoris* Hodgson).

Temnorhis Agassiz, Nomencl. Zool., Index, p. 363 (1846) (nom. emend. for *Temnoris* Hodgson).

Characters. Bill short, thick, longer than deep. Culmen strongly curved, commissure nearly straight; gonys broad, rounded, in apical half abruptly ascending. Tip of bill never acute, always more or less blunt. Nostrils remarkably small, circular and entirely hidden by antrorse, latero-frontal plumules; near base of bill a certain number of soft bristles to be observed. Wing relatively short and rounded. First (spurious) primary well developed, about two-thirds as long as second; fifth, sixth and seventh primaries forming the tip of the wing, the sixth slightly exceeding the two others. Tail, composed of narrow, elongated feathers, strongly graduated, the outermost feather being about half as long as central rectrix, and decidedly, in several species even much, longer than the wing. Tarsus nearly twice as long as middle toe without claw. Acrotarsium distinctly scutellate, the scutes sometimes fused into a single lamina. Toes moderately long, basal phalanx of middle toe adherent to outer toe for most, if not the whole of its extent; claws strongly curved. Plumage soft and copious. Pileum often with a short, but full crest. Sexes alike.

Geographical Distribution. The species of this genus are distributed over India, Burma and China, frequenting forests at elevations of from 3000 to 10,000 feet, with the exception of the races of *S. webbiana*, which are found at lower altitudes.

Habits. They are said to resemble the Tits in their habits, feeding on insects, for which they search the branches and leaves of trees. About their nidification very little is known. M. D. La Touche tells us, that *S. g. gularis* and *S. w. suffusa* build cup-shaped nests in bushes

and that the eggs of the latter species are uniform blue, while those of *S. g. gularis* have grey and brownish spots on a whitish ground-colour.

Observations. While admitting that several species, e. g. *S. r. ruficeps*, *S. r. atrosuperciliaris*, *S. f. fulvifrons*, *S. f. cyanophrys* etc. have a much blunter bill than the various races of *S. webbiana* or *S. conspicillata*, I find *S. poliotis* and allies so completely intermediate in the shape of the bill that I have not ventured to draw a line between *Suthora* and *Chleuasius*. *S. unicolor* has perhaps better claims for generic separation, on account of its large size and uniform coloration, though I do not see why it should not be included in the present genus. Still I have serious doubts as to whether the group as here defined is a natural one. The proportions of wing and tail are not the same in all species. In *S. nipalensis*, *S. gularis* and allies, and *S. poliotis* with its relatives, the tail but little exceeds the wing, while this organ is much more elongated in *S. przewalskii*, *S. fulvifrons*, *S. conspicillata*, *S. alphonsiana* and the races of *S. webbiana*. Yet *S. ruficeps* stands between the two groups, so that I have deemed it best not to make any subdivision. On the other hand, *S. davidiana* and *S. thompsoni* are very different in structural characters from all the species here included in *Suthora*.

KEY TO THE SPECIES AND SUBSPECIES OF SUTHORA

1. Larger : wing more than 80, tail about 100 mm. Upper parts brown, pileum tinged with vinaceous, lores and superciliary streak blackish, throat and sides of neck greyish brown, breast and abdomen dull fulvous, chin washed with vinaceous 1. *S. UNICOLOR*.
- Middle-sized : wing 70-75, tail 80-85 mm. Top and sides of the head, and nape clear ferruginous, strongly contrasting with the pale olive-brown of the back and the white of the throat. 2. (*S. RUFICEPS*).
- Smaller : wing considerably less than 70 mm. 3.
2. No black streak over the eye. Under parts white, faintly shaded with creamy on chest and sides 2. *S. RUFICEPS RUFICEPS*.
- A narrow black streak over the eye. Under parts tinged all over with deep buff 3. *S. RUFICEPS ATROSUPERCILIARIS*.
3. With a large black patch on the throat, sometimes half-concealed by white or rusty apical margins 4.
- No black whatever on the throat 11.
4. Top of the head smoky grey, broad superciliaries from forehead to nape black; throat-feathers black, edged with rusty, rest of under parts orange-fulvous 4. *S. NIPALENSIS*.
- Top of the head never grey, either orange-ochraceous or olive-yellowish. Throat-feathers either uniform black or edged with white; rest of under parts whitish, more or less shaded with greyish or fulvous across chest, flanks washed with greyish, fulvous or yellowish brown. 5.
5. With a long, broad superciliary stripe of black 6.
- No black superciliary stripe 9.
6. Ear coverts bright orange. Black superciliaries broader and confluent on forehead 9. *S. POLIOTIS HUMII*.

- *Ear coverts ashy grey. Black superciliaries narrower and separated from each other, the forehead being orange-ochraceous like the crown* 7.
7. *Chest, sides and under tail coverts bright fulvous* 8. S. RIPPONI.
- *Flanks and under tail coverts only bright fulvous* 12. S. POLIOTIS FEÆ.
- *Flanks pale ashy, under tail coverts white* 8.
8. *Chin and throat uniform black, the feathers of the latter scarcely fringed with white at the tip, breast and sides pale ashy grey, middle of abdomen and under tail coverts white* 10. S. POLIOTIS POLIOTIS.
- *Chin- and throat-feathers black at base, with long white tips, almost completely hiding the black ground-colour; rest of under parts sordid white, only the flanks tinged with greyish.* 11. S. POLIOTIS DAFLAENSIS.
9. *General colour of upper parts darker, bright ochraceous-brown.* 10.
- *General colour of upper parts paler, light yellowish olive, brightening to dull ochraceous-yellow on forehead and fore part of crown* 6. S. GULARIS MORRISONIANA.
10. *Bill smaller. Breast, middle of abdomen and under tail coverts silky white, flanks washed with deep ochraceous* 5. S. GULARIS GULARIS.
- *Bill longer and stouter. Chest pale grey, sides of breast and abdomen extensively bright ochraceous-brown* 7. S. GULARIS CRADDOCKI.
11. *Top of the head clear ochreous-yellow, this colour bordered laterally by a broad greyish olive or slate-grey stripe, reaching from above the eye to the sides of the nape. Anterior under parts deep ochreous-yellow.* 12. (S. FULVIFRONS).
- *Top of the head never ochreous yellow, either ashy grey (S. przewalskii), vinaceous or rufous-brown* 13.
12. *Stripe on the sides of the crown greyish olive.* 13. S. FULVIFRONS FULVIFRONS.
- *Stripe on the sides of the crown slate-grey.* 14. S. FULVIFRONS CYANOPHRYS.
13. *Crown and nape ashy grey; forehead, lores and broad superciliary stripe as far back as the sides of the nape deep rufous-brown. Underparts cinnameous, sides of breast shaded with greyish, flanks pale brownish* 15. S. PRZEWALSKII.
- *Upper part of the head deep vinaceous-brown or cinnamon-rufous. Lower surface, at least anterior parts, pale vinaceous, pink or whitish, with or without brown streaks on throat and foreneck.* 14.
14. *A narrow rim of silky white feathers round the eye (= eyelid). Top of the head deep vinaceous-brown* 16. S. CONSPICILLATA.
- *No white rim round the eye. Top of the head and nape cinnamon-rufous.* 15.
15. *Sides of the head and neck brownish ashy, strongly contrasting with colour of pileum and throat.* 17. S. ALPHONSIANA.
- *Sides of the head and neck pale or bright cinnamon, not strongly contrasting with adjoining parts* 16. S. (WEBBIANA).
16. *Top and sides of the head rather deep and bright cinnamon-rufous. Quills exteriorly edged with pale brown (= colour of back).* 17.
- *Top of the head light, rather dull cinnamon, sides of the head distinctly paler, shading into vinaceous-cinnamon or pink. Quills exteriorly edged with bright chestnut* 18.

17. *Throat and foreneck very pale pink, nearly whitish, with strongly defined shaft-streaks of rufescent brown; belly paler.* 23. *S. WEBBIANA STYANI.*
 — *Throat and foreneck decidedly pale vinaceous or vinous-pink, with merely traces of brownish shaft-lines; belly darker, especially flanks more brownish* 22. *S. WEBBIANA BRUNNEA.*
 18. *Edges to inner secondaries buff or brownish buff. Back and flanks averaging lighter.* 18. *S. WEBBIANA MANTSCHURICA.*
 — *Edges to inner secondaries deep rufescent brown or chestnut. Back and flanks averaging darker.* 19.
 19. *Bill larger and stouter : 9-9.5 mm. Tail shorter : about 58 mm.* 21. *S. WEBBIANA BULOMACHUS.*
 — *Bill smaller and slenderer : 7.5-9 mm. Tail longer : 58-67 mm.* 20.
 20. *Cinnamon of pileum and nape brighter, sides of the head vinaceous-cinnamon* 20. *S. WEBBIANA SUFFUSA.*
 — *Cinnamon of pileum and nape duller, sides of the head distinctly paler than pileum, vinaceous-pink.* 19. *S. WEBBIANA WEBBIANA.*

1. ***Suthora unicolor*** (Hodgson).

Heteromorpha unicolor Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, p. 448 (1843) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 76.

Hab. Eastern Himalaya (Nepal, Sikkim) and Mountains of Western China (Mupin, Ta-tsien-lu) at elevations of from 7000 to 10,000 feet.

2. ***Suthora ruficeps ruficeps*** (Blyth).

Chleuasiscus ruficeps Blyth, Journ. Asiat. Soc. Bengal, Vol. 14, 11, p. 578 (1845) (Darjiling, Sikkim).

Suthora oatesi Sharpe, Hand-List of Birds, Vol. 4, p. 70 (1903) (nom. emend.).

Hab. Eastern Himalaya : Sikkim.

3. ***Suthora ruficeps atrosuperciliaris*** (Godwin-Austen).

Chleuasiscus ruficeps var. *atrosuperciliaris* Godwin-Austen, Proc. Asiat. Soc. Bengal, 1877, p. 147 (1877) (Sadiya, Upper Assam).

Fig. Anderson, Results Yunnan Exp. Vol. 2, pl. 47, fig. inf.

Hab. Mountains of Upper Assam (North Cachar : Baladhan, Margherita, Sadiya; Ponsee near the frontier of Yunnan).

4. ***Suthora nipalensis*** Hodgson.

Suthora nipalensis Hodgson, Ind. Review, Vol. 2, p. 32 (1838) (Nepal).

Temnoris atrifrons Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 70, fig. sup.; Hodgson, Journ. Asiat. Soc. Bengal, Vol. 12, 1, 1843, plate to p. 450.

Hab. Eastern Himalaya : Nepal.

5. ***Suthora gularis gularis*** J. Verreaux.

Suthora gularis J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) (« Thibet chinois », the type came from Western Szechuen; cfr. loc. cit. Vol. 7, Bull. p. 36).

Suthora verreauxi Sharpe, Cat. Birds Brit. Mus. Vol. 7, p. 488 (1883) (new name for *S. gularis* Verreaux).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, Bull. pl. 3, f. 1.

Hab. Mountains of Szechuen and N. W. Fohkien in Southern China.

6. ***Suthora gularis morrisoniana*** Ogilvie-Grant.

Suthora morrisoniana Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 16, p. 119 (1906) (Mount Morrison, Formosa).

Hab. Island of Formosa : Mounts Morrison and Arizan, at altitudes of 9000 feet.

7. *Suthora gularis craddocki* Bingham.

Suthora craddocki Bingham, Bull. Brit. Ornith. Club, Vol. 13, p. 54 (1903) (Loi-Pang-Nan, Shan States).

Fig. The Ibis (8), Vol. 3, 1903, pl. 11, f. 1.

Hab. Upper Burma : Loi-Pang-Nan, east of Kengtung, in the valley of the Mekong River, southern Shan States, at elevations of 8500 feet.

8. *Suthora ripponi* Sharpe.

Suthora ripponi Sharpe, Bull. Brit. Ornith. Club, Vol. 15, p. 96 (1905) (Mt. Victoria, southern Chin Hills).

Hab. Upper Burma : Mount Victoria, in the southern Chin Hills. (Doubtful form.)

9. *Suthora poliotis humii* Sharpe.

Suthora humii Sharpe, Cat. Birds Brit. Mus. Vol. 7, p. 487 (1883) (« Eastern Himalayas »; we fix Sikkim as type locality).

Temnoris vel *Suthora pictifrons* (ex Hodgson MS.) Oates, Fauna Brit. India, Birds, Vol. 1, p. 65, in text (1889) (Darjiling, Sikkim).

Hab. Eastern Himalaya : At and above Darjiling, Sikkim.

10. *Suthora poliotis poliotis* Blyth.

Suthora poliotis Blyth, Journ. Asiat. Soc. Bengal, Vol. 20, p. 522 (1851) (Chérta Punji, Khasia Hills, Assam).

Suthora manipurensis Godwin-Austen & Walden, The Ibis (3), Vol. 5, p. 250 (1875) (Karakul, Manipur Hills).

Fig. Gould, Birds Asia, Vol. 3, pl. 69.

Hab. Assam, south of the Brahmaputra River : Khasia (Cherra Poonjee), Naga (Samma) and Manipur Hills (Karakul); Upper Burma (Bhamo, Kauri-Kachin).

11. *Suthora poliotis daflaensis* Godwin-Austen.

Suthora daflaensis Godwin-Austen, Ann. Mag. Nat. Hist. (4), Vol. 17, p. 32 (1876) (Dafla Hills).

Fig. Journ. Asiat. Soc. Bengal, Vol. 45, 11, 1876, pl. 3.

Hab. N. E. Himalaya : Dafla Hills (= Darrang), north of the Brahmaputra R., at elevations of from 5000 to 7000 feet.

12. *Suthora poliotis feae* Salvadori.

Suthora feae Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 27, p. 363 (1889) (Karennee, Burma).

Hab. South Burma : Karennee.

13. *Suthora fulvifrons fulvifrons* (Hodgson).

Temnoris fulvifrons Hodgson, Proc. Zool. Soc. Lond. Vol. 13, p. 31 (1845) (Nepal).

Fig. Gould, Birds Asia, Vol. 3, pl. 71.

Hab. Eastern Himalayas : Nepal and Sikkim at high elevations.

14. *Suthora fulvifrons cyanophrys* A. David & Oustalet.

Suthora cyanophrys A. David & Oustalet, Ois. Chine, p. 213 (1877) (S. E. Chensi, China; types in Paris Museum examined).

Fig. David & Oustalet, Ois. Chine, pl. 66.

Hab. Mountains of Western China : Southern Shen-si, at altitudes of 5400 feet.

15. *Suthora przewalskii* Berezowski & Bianchi.

Suthora przewalskii Berezowski & Bianchi, Av. Exp. Potanini, p. 67, pl. 2, f. 1 (1891) (Southern Kansu); Deditius, Journ. f. Ornith. Vol. 45, 1897, p. 69 (transl.)

Hab. N. W. China : Mountains of Southern Kansu.

16. *Suthora conspicillata* David. (Pl. 3, Fig. 3.)

Suthora conspicillata David, Nouv. Archiv. Mus. Paris, Vol. 7, Bull. pp. 9, 14 (1871) (« Kokonoor », N. W. China).

Fig. David & Oustalet, Ois. Chine, pl. 65.

Hab. Mountains of North-west China : Kokonoor, South Kansu, Tsinling, Szechuen.

17. *Suthora alphonsiana* J. Verreaux.

Suthora alphonsiana J. Verreaux, Nouv. Arch. Mus. Paris, Vol. 6, Bull. p. 35 (1870) (« Thibet chinois », the type was obtained near « Tchentou »; cfr. loc. cit. Vol. 7, Bull. p. 35).

Fig. Nouv. Arch. Mus. Paris, Vol. 8, Bull. pl. 3, f. 2.

Hab. Mountains of S. W. China : Szechuen and Yunnan.

18. ***Suthora webbiana mantschurica*** Taczanowski.

Suthora webbiana, mantschurica Taczanowski, Bull. Soc. Zool. Fr. Vol. 10, p. 470 (1885) (Alamanowka in Ussuriland).
Hab. S. E. Siberia : Ussuriland.

19. ***Suthora webbiana webbiana*** Gray.

Suthora Webbiana Gray, Proc. Zool. Soc. Lond. Vol. 20, 1852, p. 70 Aves, pl. 49 (May 1854) (Shanghai; type examined).
Suthora fulvicauda C. W. Campbell, The Ibis (6), Vol. 4, p. 237 (1892) (Chemulpo, Corea; = juv.; type in Brit. Mus. examined).
Suthora longicauda C. W. Campbell, ibidem, p. 237 (1892) (« thirty miles south-east of Sëoul, Corea »; = ♀ ad.; type in Brit. Mus. examined).
Fig. Gould, Birds Asia, Vol. 3, pl. 72.
Hab. Eastern China (Shanghai, Ningpo), apparently also in Hupeh and Kansu; Corea.

20. ***Suthora webbiana suffusa*** Swinhoe.

Suthora suffusa Swinhoe, Proc. Zool. Soc. Lond. 1871, p. 372 (1871) (« about the mountainous sides of the gorges of the upper Yangtsze »).
Hab. Central China : valley of the Yangtsze kiang (Kiukiang, Ichang, Shashi) southwards to Fohkien.

21. ***Suthora webbiana bulomachus*** Swinhoe.

Suthora bulomachus Swinhoe, The Ibis (new ser.) Vol. 2, p. 300, pl. 9 (1886) (Formosa).
Hab. Island of Formosa.

22. ***Suthora webbiana brunnea*** Anderson.

Suthora brunnea Anderson, Proc. Zool. Soc. Lond. 1871, p. 211 (1871) (Momien, Yunnan).
Fig. Anderson, Results Yunnan Exp. Vol. 2, pl. 49, fig. inf.
Hab. S. W. China : Momien in Western Yunnan, west of the Salween River.

23. ***Suthora webbiana styani*** Rippon.

Suthora styani Rippon, Bull. Brit. Ornith. Club, Vol. 13, p. 54 (1903) (Tali Valley, W. Yunnan).
Hab. S. W. China : Tali Valley in Western Yunnan, east of the Mékong River.

18. GENUS NEOSUTHORA NOV. GEN.

Characters. Bill very much larger and quite differently shaped, as compared with the members of the genus *Suthora*. Upper mandible much deeper, culmen less convex, with the mesorhinium much broadened and flattened, and not distinctly curved towards the tip; commissure, as in *Suthora* and *Psittiparus*, with scarcely an indication of a slight sigmoid curve; lower mandible of nearly the same shape as in *Suthora*, but more swollen, deeper and in the apical portion even more abruptly turned upwards. Tip of bill conspicuously blunt and obtuse, even more so than in the species of the extreme *Chleuasicus*-type. Wings more rounded than in *Suthora*, the fourth to seventh primaries being the longest. First primary well developed, more than half as long as the longest remex. Tail, composed of rather narrow, pointed feathers, much shorter than in *Suthora*, about three-fourths as long as the wing and, instead of being strongly graduated, but slightly rounded; the outermost rectrix falling short of the other tail-feathers, which are nearly equal, by about the length of the hind toe without claw. Legs and feet decidedly stronger and more robust than in *Suthora*. Plumage less copious and not so soft. Sexes alike. Type of the genus : *Suthora davidiana* Slater.

Coloration. Top and sides of the head bright cinnamon-rufous; back pale slate-grey, with or without olive tinge; wings and tail-feathers dusky, exteriorly margined with bright

rufescent brown; chin and upper throat black; lower throat and chest greyish, washed with buffish on middle of breast; flanks, abdomen and lower tail coverts clear brownish ochraceous. Bill yellow. Wing 50-52, tail 36-38 mm.

Geographical Distribution. Mountain-ranges of Southern China (Fohkien), and of southern Shan States in Burma.

KEY TO THE SUBSPECIES OF NEOSUTHORA

1. *Black throat-feathers with distinct white apical spots. Cinnamon-rufous of head clearer and extending on to the upper back* 1. *N. DAVIDIANA DAVIDIANA*.
- *Throat-feathers uniform black. Cinnamon-rufous of head deeper and restricted to pileum and nape* 2. *N. DAVIDIANA THOMPSONI*.

1. *Neosuthora davidiana davidiana* (Slater). (Pl. 3, Fig. 1.)

Suthora davidiana Slater, The Ibis (7), Vol. 3, p. 172, pl. 4, f. 1 (1879) (Kuatun, N. W. Fohkien).

Hab. Mountains of N. W. Fohkien, South China.

2. *Neosuthora davidiana thompsoni* (Bingham).

Suthora thompsoni Bingham, Bull. Brit. Ornith. Club, Vol. 13, p. 63 (1903) (Kyatpyin near Paunglaung stream, Loilong, southern Shan States).

Fig. The Ibis (8), Vol. 3, 1903, pl. 11, f. 2.

Hab. Upper Burma, southern Shan States : Kyatpyin near the Paunglaung River in the Loilong State, at altitudes of 2500 feet.

19. GENUS PSITTIPARUS HELLMAYR

Scæorhynchus (nec E. B. Wilson 1881, *Pycnogonidae*!) E. W. Oates, Fauna Brit. India, Birds, Vol. 1, p. 68 (1889) (sp. typ. : *Paradoxornis ruficeps* Blyth).

Psittiparus Hellmayr, Tierreich, Livr. 18, p. 163 (1903) (same type).

Characters. In general structure the members of this genus are not unlike *Neosuthora*, but, besides being much larger, they have the tail proportionately longer and a differently shaped bill. The culmen is far more convex and in its apical portion strongly curved, the mesorhinium not flattened at all, being somewhat elevated and decidedly rounded; the sigmoid curve of the commissure rather more pronounced; the lower mandible less high and not so swollen, with the gonys not abruptly ascending; the tip of the bill, though not acute, distinctly pointed, not blunt. In the wing the fifth, sixth and seventh primaries are the longest, the first primary somewhat more than half as long as the wing. Tail about four-fifths of the length of the wing, slightly rounded; the outermost rectrix being from 10 to 15 mm. shorter than the central one; the penultimate rectrix about 6 mm. longer, but a little shorter than the third and so on. Legs and feet relatively stronger than in *Neosuthora*, apparently more adapted to terrestrial habits.

Coloration. Back and wings clear olive or pale rufescent brown, tail duller, more greyish. In one species (*P. ruficeps*) the top and sides of the head are bright ferruginous, in the other (*P. gularis*) the upper part of the head is ashy grey, with a well-defined black frontal- and superciliary stripe, while the lores, cheeks and ear coverts are white, more or less shaded with pale cinereous. Bill (in skin) bright yellow.

Geographical Distribution. The species of *Psittiparus* inhabit the mountains of India, Burma, Southern China and the island of Hainan, at elevations of from 2500 to 8000 feet.

Habits. These birds frequent bamboo-thickets, reeds and tall grasses. They construct a cup-shaped nest of grass-stalks, coated externally with a few cobwebs and lined inside with stripes of bamboo-stems; its eggs, three in number, are white, spotted and blotched with grey and pale brown.

KEY TO THE SPECIES AND SUBSPECIES OF PSITTIPARUS

1. *Top and sides of the head and neck clear ferruginous. Throat and foreneck white or buff* 2. (P. RUFICEPS).
- *Crown and nape cinereous; narrow frontal band and long superciliaries black. Lores and cheeks white, ear coverts and sides of the neck whitish or pale cinereous. A black patch on the throat* 3. (P. GULARIS).
2. *Bill smaller: 14, wing averaging shorter: 85-88 mm. Under surface of body white, chest and flanks faintly shaded with pale buff* 1. P. RUFICEPS RUFICEPS.
- *Bill larger: 16-17, wing averaging longer: 87-95 mm. Under surface of body strongly tinged with deep buff or fulvous buff* 2. P. RUFICEPS BAKERI.
3. *Under surface of body strongly suffused with fulvous buff. Wing 83-88 mm.* 4. P. GULARIS TRANSFLUVIALIS.
- *Under surface of body white* 4.
4. *Black throat-patch smaller and higher up on the chin. Subocular region and ear coverts white or greyish white. Wing 90-95 mm.* 3. P. GULARIS GULARIS.
- *Black throat-patch larger and lower down, leaving a distinct white space on the chin. Subocular region and cheeks cinereous* 5.
5. *Larger: wing 97-100, tail 88-90 mm.* 5. P. GULARIS FOKIENSIS.
- *Smaller: wing 84-87, tail 80-83 mm.* 6. P. GULARIS HAINANUS.

1. *Psittiparus ruficeps ruficeps* (Blyth).

Paradoxornis ruficeps Blyth, Journ. Asiat. Soc. Bengal, Vol. 11, 1, p. 177 (1842) (« Bootan »).

Fig. Gould, Birds Asia, Vol. 3, pl. 78.

Hab. Eastern Himalayas: Sikkim and Bhutan.

2. *Psittiparus ruficeps bakeri* (Hartert).

Scaeorhynchus ruficeps bakeri Hartert, Novit. Zool. Vol. 7, p. 548 (1900) (Hungrum, North Cachar).

Hab. Assam: hills south of the Brahmaputra (Khasia hills, Cachar) and Burma, southwards to Karennee, and Tenasserim (as far south as Thoungyah).

3. *Psittiparus gularis gularis* (Gray).

Paradoxornis gularis Gray Genera Birds, Vol. 2, p. 389, pl. 94, f. 2 (1845) (no locality; we fix Sikkim as type locality)

Paradoxornis caniceps Blyth, Journ. Asiat. Soc. Bengal, Vol. 18, 11, p. 810 (1849) (Darjiling).

Fig. Gould, Birds Asia, Vol. 3, pl. 77.

Hab. Eastern Himalaya: Sikkim and Bhutan, at elevations of from 3000 to 6000 feet.

4. *Psittiparus gularis transfluvialis* (Hartert).

Scaeorhynchus gularis transfluvialis Hartert, Novit. Zool. Vol. 7, p. 548 (1900) (Guilang, North Cachar).

Hab. Assam: hill ranges south of the Brahmaputra R. (Khasia hills, Cachar); Burma (Karennee, Loilong, southern Shan States).

5. *Psittiparus gularis fokiensis* (David).

Heteromorpha Fokiensis David, Ann. Sc. Nat. Zool. (5), Vol. 19, art. no. 9, p. 4 (1874) (« à Koatén, dans le Fokien occidental »).

Fig. David & Oustalet, Ois. Chine, pl. 61.

Hab. South China: Mountains of West Fokien.

6. *Psittiparus gularis hainanus* Rothschild.*Psittiparus gularis hainanus* Rothschild, Bull. Brit. Ornith. Club, Vol. 14, p. 7 (1903) (Mount Wuchi, Hainan).

Hab. Mountains of the Island of Hainan.

20. GENUS *CONOSTOMA* HODGSON*Conostoma* Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 11, p. 856 (1841) (sp. un. : *C. aemodius*).

Characters. Bill longer and less elevated than in the preceding genera, with the culmen not so strongly convex; commissure without the slightest trace of a sigmoid curve, gonys straight, at the tip slightly ascending. Wing rounded; sixth and seventh primaries forming the tip, the first (spurious) quill somewhat exceeding two-thirds of the second primary. Tail slightly graduated, and distinctly longer than the wing. Acrotarsium covered in front with large scutes. Toes long and robust, the hind toe with rather long, strongly curved claw. Plumage long and soft. Sexes alike.

Coloration. Upper parts dull rufescent brown, forehead brownish white; lores and feathers in front of the eye dark brown. Wings greyish brown, outer webs of secondaries on basal portion bright rufescent brown. Tail-feathers greyish brown, along the shaft washed with rufescent brown. Under surface dingy greyish brown, more brownish on flanks, more greyish in the middle of the belly; throat with indistinct whitish longitudinal streaks. Axillaries and under wing coverts light buff. Bill dark yellow. Wing 120-130, tail 130-140, bill 23-24 mm.

Geographical Distribution. Eastern Himalaya (Nepal and Sikkim) at elevations of from 10,000 to 11,000 feet, and high mountains of Western China (Szechuen, Kansu).

Habits. « Constructs a hemispherical nest of dry stems and blades of grass and bamboo-leaves on a branch of a bamboo in May. The eggs, probably three in number, are dull white, blotched and streaked with yellowish brown and spotted about the larger end with dark purple » (Oates).

1. *Conostoma aemodium* Hodgson.*Conostoma aemodius*, *C. oemodius*, *C. omodius*, Hodgson, Journ. Asiat. Soc. Bengal, Vol. 10, 11, pp. 856, 857, with plate (1841) (« Northern Region of Nepal »).

Fig. Gould, Birds Asia, Vol. 3, pl. 31.

Hab. Eastern Himalaya (Nepal, Sikkim) and high Mountains of Western China (Szechuen, Kansu).

N. B. I have not seen specimens from any Chinese locality.

5. SUBFAM. PANURINÆ

THE BEARDED TITS

Characters. Bill very short, about as long as inner toe without claw, broadened at base, where its width slightly exceeds its depth; culmen rounded, abruptly decurved in apical half, with uncinat tip; maxillary commissure distinctly convex; gonys but little ascending terminally. Nasal fossæ large, roundish operculate, the slit-like, nasal opening situated near lower edge and entirely concealed by the dense, antrorse, bristly latero-frontal plumules. Rictal bristles well developed, though rather short and soft, not reaching beyond basal third of bill.

Tongue horny, obtuse, divided at the end, terminating in a few horny bristles. Wing moderately long, narrow and somewhat pointed, third, fourth and fifth primaries longest and nearly equal in length, sixth a little shorter; second as long as sixth; first primary rudimentary, reduced to an excessively narrow, lanceolate feather, even shorter than primary coverts. Tail much lengthened, very much longer than wing, exceedingly graduated, outermost rectrix scarcely half as long as median; rectrices narrow, attenuated at tip. Under tail coverts remarkably well-developed, in length equal to outermost rectrix. Tarsus strong, about twice as long as middle toe without claw; acrotarsium distinctly scutellate; middle toe longest, outer toe slightly longer than inner one; claws slender, compressed, acute; hallux stouter and shorter than the other toes, its claw much stronger. Wing 57-63, tail 75-90 mm.

Coloration. Plumage soft, though less copious than in the *Parinae*. Sexes different, the male ornamented by a broad black moustache of elongated feathers. The adult male is a very elegantly coloured creature. Top of the head, nape and ear coverts delicate pale grey, passing into white on frontal edge and sides of neck. Lores, cheeks and moustache deep velvety black. Back and rump deep cinnamon-buff; upper tail coverts brownish pink; scapulars white; wing coverts black, broadly edged with colour of back; primary coverts and bastard-feathers blackish, with broad white edges; primaries dark grey-brown, the outer ones with white, the remaining with isabelle margins; secondaries dark greyish brown, broadly edged with deep cinnamon-buff; the three innermost with a broad black stripe along the shaft and nearly white on inner web. Rectrices isabelle-colour, below more cinnamon, the two outer pairs black on basal portion and with a long white tip. Throat and breast white, sides of breast washed with pale pink, flanks cinnamon-buff; under tail coverts deep velvety black. The female differs by having the head above and nape pale brownish, the sides of the head dingy white, without the black mystacial stripe, and the under tail coverts very pale buff. The black of the outer rectrices, too, is less pronounced. The young have the middle of the back and the rectrices (except the median pair) mostly blackish; the first primary is well developed, of normal shape and almost half as long as second. Bill yellow.

Geographical Distribution. South- and Western Europe, and Palæarctic Asia eastward to Northern China and Amoorland. One species with two subspecies.

Habits and Nidification. The Bèarded Tit lives exclusively in extended reed-thickets and marshes. Its call-note and song are not unlike those of the true *Parinae*, which it also resembles in habits and food. The nest, an open, cup-shaped, loose structure of dried reed-stems, grasses, leaves etc., inside lined with various soft material, feathers etc., is placed on or near the ground. The clutch consists of from five to seven roundish eggs, which are glossy or buffy white, speckled with blackish brown. Two broods : one in April and May, the second from June to the beginning of August.

21. GENUS PANURUS C. L. KOCH

Panurus C. L. Koch, Syst. Baier. Zool. p. 201 (1816) (sp. un. : *P. biarmicus*).

Calamophilus Leach, Cat. Mamm. Birds Brit. Mus. p. 17 (1816) (sp. un. : *C. biarmicus*).

Mystacinus Boie, Isis, p. 556 (1822) (sp. typ. : *M. barbatus*).

Hypenites Gloger, Gemeinn. Naturg. Vög. Deutschl. p. 281 (1842) (sp. un. : *H. barbatus*).

Characters, Habits, Nidification as those of the Subfamily.

KEY TO THE SUBSPECIES OF PANURUS BIARMICUS

1. Back and rump deeper, cinnamon-brown; upper tail coverts faintly washed with pink 1. *P. BIARMICUS BIARMICUS*.
 — Back and rump paler, more cinnamon-buff; upper tail coverts decidedly washed with pink 2. *P. BIARMICUS RUSSICUS*.

1. *Panurus biarmicus biarmicus* (Linnaeus). (Pl. 2, Fig. 10.)

Parus biarmicus Linnæus, Syst. Nat., ed. 10, p. 190 (1758) (« Habitat in Europa »; based on Albin, Avium, Vol. 1, p. 46, pl. 48, and Edwards, Nat. Hist. Birds, Vol. 2, p. 55, pl. 55. Albin's figure is barely recognizable, while that of Edwards unquestionably refers to the dark-coloured western bird. Moreover, the latter author expressly states that the specimens described were brought alive from Copenhagen and adds having seen others « shot among the reeds in marshes near London »).

Parus barbatus Pallas, Zoogr. Rosso-Asiat. Vol. 1, p. 549 (1827) (new name for *P. biarmicus* Linnæus).

Mystacinus arundinaceus Brehm, Handb. Naturg. Vög. Deutschl. p. 474 (1831) (« bewohnt den Nordosten der alten Welt, wandert aber im Herbst und kommt dann an die Küste der deutschen Ostsee, häufig nach Holland, sogar, jedoch selten an den Eisleber und andere grosse Seen unseres Vaterlandes ». Pure hypothetical speculations, for the Bearded Tit never occurred in any part of N. E. Europe; the birds said to have nested on the salt-lakes near Eisleben, Thuringia, most certainly belonged to the western race).

Mystacinus dentatus Brehm, ibidem, p. 474 (1831) (Holland).

Panurus biarmicus occidentalis Tschusi, Ornith. Jahrb. Vol. 15, p. 228 (1904) (Venetia).

Fig. Dresser, Birds Europe, Vol. 3, pl. 102.

Hab. South Europe (Italy, north to Venetia and Lombardy, Southern France, Eastern Spain); England (nowadays only breeding in Norfolk); Holland; formerly breeding in the marshes of Northern Germany as far east as Mecklenburg. It was probably this form that is reported to have nested on the salt-lake near Eisleben, Thuringia.

2. *Panurus biarmicus russicus* (Brehm).

Mystacinus Russicus Brehm, Handb. Naturg. Vög. Deutschl. p. 472 (1831) (« sie lebt in Russland, kommt im Herbst und Winter nach Ungarn und in die Nähe von Wien »).

Calamophilus sibiricus Bonaparte, Compt. Rend. Acad. Sc. Paris, Vol. 43, p. 414 (1856) (« Kamtschatka », locality erroneous).

Panurus biarmicus raddei Prazák, Journ. f. Ornith. Vol. 45, p. 288 (1897) (based on Radde [Ornis, Vol. 3, 1887, p. 477 : Astara near Lenkoran, Caspian Sea], who described a young bird as adult).

Hab. Breeding in Eastern Europe (East Galicia, Hungary, Roumania, South Russia), Asia Minor, Persia, West Siberia, Turkestan (Zaidam, Kookonor, Ordos), Manchouria as far east as Sidemi, Amoor Bay, in S. E. Siberia. It is probably this form that appears in Greece during the winter months.

6. SUBFAM. CERTHIPARINÆ

It is proposed to associate, in this group, the three New Zealand genera *Mohoua*, *Certhiparus* and *Finschia*, although I must confess that I have serious doubts as to whether they really have any close relations to the *Paridae*, and whether the last-named genus may not ultimately prove to be altogether different from the two others. Yet the three species agree *inter se* in the exceedingly long, rather robust tarsus, a character which separates them at a glance from all the other members of the family of Tits. *Mohoua*, furthermore, differs very markedly in the proportions of the toes, while *Finschia* and *Certhiparus* resemble, in this respect, the true Tits. The last-named genus and *Mohoua*, on the other hand, present another striking character in the pointed rectrices with the shafts stiffened and acuminate, indicating arboreal habits, whereas

Finschia has soft, rounded tail-feathers, as well as a much smaller, slenderer bill. Dr. Finsch considers *Mohoua* to be nearly allied to the Timeliine genus *Orthonyx*, and refers the two others to the *Paridae*. Until careful anatomical investigations of the three types have been made every classificatory attempt must necessarily be regarded as provisional.

Characters. Bill much shorter than head, about equal to middle toe (without claw), at base as wide as, or even wider than deep, distinctly compressed, at least for terminal portion; culmen conspicuously decurved terminally; gonys nearly straight, but slightly ascending towards the tip. Rictal bristles obvious. Nostrils basal, distinctly operculate, posteriorly overhung by antrorse, latero-frontal plumules. Wing short, either somewhat pointed (*Mohoua*, *Certhiparus*) or distinctly rounded (*Finschia*); fourth and fifth, or fifth and sixth, primaries longest; first primary much more than half as long as second; wing-tip very much less than length of tarsus. Tail graduated, extremely variable as to relative length and shape of rectrices. Tarsus robust, fully twice as long as middle toe (without claw); acrotarsium scutellate or booted; proportion of toes variable (see key); middle toe adherent to outer one for greater part of basal phalanx, to inner toe for a less distance. Claws very strong, much curved, with acute tip. Plumage soft and copious as in the *Parinae*.

Coloration variable. *Mohoua* and *Certhiparus* have the head of the same colour as the under parts, yellow in the former, dingy white in the latter; back and wings brown, rectrices dull olive in *Mohoua*, pale brown in *Certhiparus*. *Finschia* has the crown, upper tail coverts and the tail rufous-brown, the latter crossed by a blackish band, the sides of head and nape dark ashy, the back brown, the lower parts isabelline-buff.

Geographical Distribution. New Zealand.

KEY TO THE GENERA OF CERTHIPARINÆ

1. Tail much shorter than the wing, rectrices with shafts stiffened and distinctly projecting. Outer and middle toes equal in length, much longer than inner toe. 22. Genus MOHOUA.
— Tail equal to, or longer than, the wing. Middle toe longest, outer toe slightly longer than the inner one 2.
2. Bill rather broadened at base, where its width decidedly exceeds its depth, slightly compressed terminally. Tail about equal to wing, with rectrices acuminate at tip 23. Genus CERTHIPARUS.
— Bill slender, much compressed laterally, at base fully as deep as wide. Tail decidedly longer than wing, with rectrices soft and broadly rounded at tip . . . 24. Genus FINSCHIA.

22. GENUS MOHOUA LESSON

Mohoua Lesson, Compl. Œuvr. Buffon, Vol. 9. p. 139 (1837) (sp. typ. : *Mohoua hua* Lesson).

Clitonyx Reichenbach, Avium Syst. pl. 38 (1849) (sp. typ. : *Clitonyx ochrocephalus* Gmelin).

Characters. Bill much shorter than head, somewhat broadened at base, where its width decidedly exceeds its depth, much compressed terminally; culmen distinctly ridged, strongly decurved in apical portion; gonys nearly straight. Nostrils basal, operculate, only posteriorly

concealed by antrorse latero-frontal plumules. Rictal bristles distinct, though soft and short, not reaching beyond anterior end of nasal fossa. Wing long, rather pointed; fourth and fifth primaries longest, sixth but little shorter, though conspicuously longer than third; second falling between eighth and ninth; first primary well developed, broad, much more than half as long as second. Tail much shorter than wing, graduated, rectrices somewhat pointed at tip, with the shafts stiffened and distinctly projecting. Tarsus robust, very long, much longer than middle toe with claw; acrotarsium scutellate, the scutes, however, often fused into a single lamina, the divisions being obliterated. Toes long, outer and middle toes equal in length, and conspicuously longer than inner toe; outer toe adherent to middle toe for its entire basal phalanx; hallux about equal to outer toe or slightly longer, but much stouter; claws robust, strongly curved, especially that of hallux, which is scarcely shorter than the digit. Wing 80-84, tail 62-70, tarsus 25-28, bill about 13 mm.

Coloration. Sexes alike. Plumage soft and copious. Head all round, foreneck, breast and abdomen bright lemon-yellow, sides and flanks dull olive-brownish; under tail coverts dingy white, with dusky bases. Back, rump and upper tail coverts dull greenish olive-brown. Wings dusky, edged with olive-brown. Tail dull greenish olive, paler beneath, with shafts above reddish brown, below whitish. Bill black. Feet brown. The young birds differ from the adult ones in having the yellow portions of the plumage duller, and the head above obscured by dusky olive edges to the feathers.

Geographical Distribution. New Zealand.

Observations. The systematic position of this bird is still very uncertain. In structural characters, it shows a great likeness to the Australian genus *Orthonyx*, commonly referred to the *Timeliidae*, and I should not be surprised if it would ultimately prove to belong to this group rather than to the *Paridae*. From the latter it very markedly differs by its very long, thick tarsus, the proportion of the toes and by having the shafts of the rectrices stiffened and projecting.

1. *Mohoua ochrocephala* (Gmelin). (Pl. 3, Fig. 6)

Muscicapa ochrocephala Gmelin, Syst. Nat. Vol. 1, 11, p. 944 (1789) (based on « Yellow-headed Flycatcher », Latham, Gen. Syn. Birds, Vol. 2, 1, p. 342 : « Queen Charlotte's Sound, in New Zealand »).

Certhia heteroclitus Quoy & Gaimard, Voyage Astrolabe, Vol. 1, p. 223, Ois. pl. 17, f. 1 (1830) (« habite la baie Tasman »).

Mohoua hua Lesson, Compl. Oeuv. Buffon, Vol. 9, p. 139 (1837) (Nouvelle-Zélande).

Orthonyx icterocephalus Lafresnaye, Rev. Zool. Vol. 2, p. 257 (1839) (« in insulis les Marquises dictis », errore !).

Parus heteroclytus Lafresnaye, Mag. Zool. Cl. 2, Ois. pl. 8 (1839) (Nouvelle-Zélande).

Muscicapa chloris Forster, Descr. Anim. Austr. p. 87 (1844) (« in insula australi Novæ Zeelandiæ »).

Fig. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, 1887, pl. 6.

Hab. South Island of New Zealand.

23. GENUS *CERTHIPARUS* LAFRESNAYE

Certhiparus Lafresnaye, Rev. Zool. Vol. 5, p. 69 (1842) (sp. typ. : *Parus senilis* Dubus).

Certhioparus Agassiz, Nomencl. Zool., Index, p. 75 (1846) (nom. emend.).

Phyllodytes (nec Wagler 1830, *Amphibia*!) Finsch, Journ. f. Ornith. Vol. 21, p. 397 (1873) (nom. emend. pro *Certhiparus* Lafresnaye).

Characters. Bill similar in shape to that of *Mohoua*, but rather slenderer. Nostrils basal, operculate and posteriorly concealed by the antrorse, latero-frontal plumules, exactly as in *Mohoua*. Rictal bristles equally short, but somewhat stronger and stiffer. Wing long, pointed; fifth and sixth primaries longest, fourth and seventh but a little shorter; third falling between seventh and eighth; second about equal to tenth, scarcely longer than secondaries; first primary conspicuously longer than half the second. Tail very long, about equal to wing, strongly graduated; rectrices rather pointed, with the shafts acuminate and slightly projecting, but much less stiffened than in *Mohoua*. Tarsus much slenderer than in *Mohoua*, conspicuously longer than middle toe with claw; acrotarsium booted, sometimes a few obsolete scutes on lower portion. Toes more slender than in *Mohoua*; middle toe longest, outer toe slightly longer than inner one; hallux about as long as outer toe, but stouter, its claw decidedly shorter than the digit. Claws shorter and much more compressed than in *Mohoua*, strongly arched. Wing 70-75, tail 70-73, tarsus about 26, bill 12 mm.

Coloration. Plumage soft and copious. Sexes alike. Head all round, breast and middle of abdomen white, shaded with greyish on crown, with buffy on belly; flanks washed with brownish. Back pale reddish brown; lesser upper wing coverts paler brown, the median and greater series dusky, with broad whitish brown edges; remiges and rectrices brown, the former exteriorly edged with paler brown. Bill and feet black. Young birds are duller in colour, the white of the pileum is mixed with brown and the under parts are less purely white.

Geographical Distribution. New Zealand.

Observations. While closely resembling *Mohoua* in shape of bill and tail as well as in style of coloration, yet *Certhiparus* is easily distinguished by its relatively longer tail, different proportion of the toes and different wing-formula.

1. ***Certhiparus albicilla*** (Lesson). (Pl. 3, Fig. 8.)

Fringilla albicilla Lesson, Voy. Coquille, Vol. 1, II, p. 662 (1828) (« à la baie des Iles à la Nouvelle-Zélande »).

Parus senilis Dubus, Bull. Acad. Bruxelles, Vol. 6, I, p. 297 (1839) (Nouvelle-Zélande).

Clitonyx albicapilla W. L. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, p. 53 (1887) (nom. emend.).

Certhiparus cinerea Ellman, The Zoologist, Vol. 19, p. 7465 (1861) (nom. nud.).

Fig. Buller, loc. cit. pl. 6.

Hab. North Island of New Zealand.

24. GENUS *FINSCHIA* HUTTON

Finschia Hutton, The Ibis (8), Vol. 3, p. 319 (sp. type : *Certhiparus novae zealandiae* auct.).

Characters. Bill very short, about half as long as head, slender, much compressed, its width at base being equal to its depth; culmen decidedly convex; gonys nearly straight. Rictal bristles numerous, well-developed, reaching almost to tip of bill. Nostrils basal, distinctly operculate, almost completely hidden by antrorse, latero-frontal plumules. Wing moderately long, rounded; fifth and sixth primaries longest, fourth little shorter, but decidedly longer than seventh; third falling between seventh and eighth, second equal to tenth; first primary conspicuously longer than half the second. Tail much longer than wing, strongly graduated, with rectrices soft and broadly rounded at tip, shafts not stiffened nor projecting. Tarsus shorter

than in the preceding genera, though still conspicuously longer than middle toe with claw; acrotarsium booted or very indistinctly scutellate. Toes slender and of the same proportions as in *Certhiparus*, the middle toe being longest, the outer toe slightly longer than inner one; hallux about as long as inner toe, but much stouter. Claws as in *Certhiparus*. Wing 60-65, tail 65-70, tarsus 22-23, bill about 11 mm.

Coloration. Plumage exceedingly lax and copious. Sexes alike. Forehead and crown dull rufous; sides of the head and neck, as well as a broad band round the nape, dark ashy grey; behind the eye a more or less distinct greyish white streak. Back and upper wing coverts warm rufescent brown, remiges dusky, edged with rufescent brown. Upper tail coverts and rectrices cinnamon-brown, the latter (except the two middle pairs) with a broad blackish band across inner web. Under parts buff, palest on throat, deepest on belly. Bill and feet pale brown.

Geographical Distribution. New Zealand.

Observations. The genus *Finschia* is very distinct from *Mohoua* and *Certhiparus*, though agreeing with the latter in proportion of toes. It may be recognized by its very much smaller bill, and by having the tail distinctly longer than the wing, with the rectrices broadly rounded, not acuminate at tip.

1. *Finschia novæ-seelandiæ* (Gmelin). (Pl. 3, Fig 7.)

Parus novæ Seelandiæ Gmelin, Syst. Nat. Vol. 1 II, p. 1013 (1789) (based on «New Zealand Titmouse», Latham, Gen. Syn. Birds, Vol. 2, II, p. 558 : «Dusky Bay, New Zealand»).

Certhiparus maculicaudus G. R. Gray, in E. Dieffenbach, Travels in N. Zealand, Vol. 2, p. 189 (1843) (New Zealand).

Parus urostigma G. R. Forster, Descr. Anim. Austr. p. 90 (1844) («in insula australi Novæ Zeelandiæ»).

Fig. Buller, Hist. Birds New Zeal., ed. 2, Vol. 1, 1887, pl. 6.

Hab. South Island of New Zealand.

EXPLANATION OF PLATES

PLATE I

- Fig. 1. Head of *Penthornis semilarvatus*.
 — 2. Head of *Parus rex* ♂ ad.
 — 3. Head of *Parus funereus*.
 — 4. Head of *Parus ater* cypriotes.
 — 5. Head of *Parus ater* ledouci.
 — 6. Foot of *Parus major* major.
 — 7. Entire figure of *Parus nigriloris*.
 — 8. Head of *Parus atricapillus montanus*.
 — 9. Head of *Parus palustris communis*.
 — 10. Head of *Parus superciliosus*.
 — 11. Head of *Parus cyanus cyanus*.
 — 12. Head of *Parus cyanus tianschanicus*.

19TH PART

GRUES

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. L. BRASIL, A. DUBOIS, E. HARTERT,
C. E. HELLMAYR, Hon. W. ROTHSCHILD, T. SALVADORI, &^a

GRUES

FAM. GRUIDÆ

by L. BRASIL

WITH 3 COLOURED PLATES

1913

PRICE 9/0 (FR. 17.25)



PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

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FAM. GRUIDÆ

FAM. GRUIDÆ

BY L. BRASIL



THE *Gruidæ* or Cranes are large wading-birds. They form in the Order *Grues*, *Gruiformes*, or *Alectorides* a well-characterised Family.

Characters. The neck is long. The bill is straight, rather compressed, moderate in length, with nasal furrows, which reach beyond the middle of the upper mandible; the nostrils are elongated or oval, closed posteriorly by a large membran; the lower mandible is provided on each side with a lateral groove. The legs are very long. The tibiæ are partly bare. The metatarsi are slender, scutellated in front, reticulated behind. The toes are four in number; they are rather short, strong, and furnished with sharp hooked claws; the hallux is small, much elevated. The wings are ample and powerful; the inner secondaries exceed the primaries and are generally composed of drooping feathers with dissociated webs; sometimes the innermost are enormously lengthened. The tail is short; there are twelve rectrices. Feathers have an aftershaft.

Powder-down patches are absent. The oilgland is tufted.

The ambiens, semi-tendinosus, and accessory muscles are always present. The trachea is always convoluted, more or less, with the exception of *Balearica*. The gallbladder is present. The cæca are variable in length, from 7 to 20 cm. The skull is schizognathous, without basipterygoid processes and has occipital foramina. The impressions for the supra-occipital glands are slight and hard to see from above. The sternum is generally perforated in front when the trachea is convoluted.

Habits and Reproduction. Cranes, for the most part, are mainly vegetable-feeders, but they eat greedily mollusks and earthworms, and they pick up also any small mammal, reptile, amphibian or fish that comes in their way. They prefer usually to stay near water, in the neighbourhood of marshes or lagoons, also they are found on large open plains, sandy flats or on the sea-shore. Their voice is generally a sonorous trumpet-like note. Cranes are gregarious birds and form usually very large flocks, which in winter, for the northern species, migrate southwards. In the breeding season flocks break up into pairs. Nuptial ceremonies consisting mainly of special dances are sometimes found. Cranes are said to pair for life; they return

annually to the same breeding haunts. The nest is made in shallow water or on ground; it is a large conical mass of aquatic plants, a hole or a slight depression on the dry and bare ground. In rule two eggs are laid, sometimes, though rarely, they are three in number. The eggs are creamy white, olive brown or buff, more or less streaked and blotched with reddish brown, red or purplish grey spots. The nestling is covered with down and able to run soon after it is hatched.

Sexual characters are very slight. The male is usually larger, with the naked parts, if any, more conspicuous.

Range. The *Gruidæ* inhabit all the great zoogeographical Regions, except the New Zealand one and, in the Neotropical, south of Mexico. Nor are they never found in Malayan Archipelago, Papuasia and Polynesian Islands.

Bibliography. Tegetmeier Blyth, Nat. Hist. Cranes (1881); Sharpe, Cat. Birds Brit. Mus., Vol. 23, pp. 248-277 (1894); Blaauw, Monog. Cranes (1897); Sharpe, Hand-list Birds, Vol. 1, pp. 176-179 (1899); Dresser, Man. Pal. Birds, Vol. 2, pp. 717-723 (1903); Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904, Vol. 2, pp. 200-205.

Two Subfamilies can be distinguished.

SUBFAM. A. GRUINÆ

Bill equal to or longer than the head. Nostrils linear. No tuft of straw-like bristles on the nape. Trachea convoluted.

The *Gruinæ* contain eight Genera.

SUBFAM. B. BALEARICINÆ

Bill shorter than the head. Nostrils oval and oblique. A tuft of straw-like bristles on the nape. Trachea without convolutions.

The *Balearicinæ* contain only a single Genus.

A. SUBFAM. GRUINÆ

KEY TO THE GENERA

A. Crown of head naked.

a. Ears-coverts feathered like the cheeks and sides of neck.

a'. The cheeks wholly feathered 1. Genus GRUS.

b'. The cheeks more or less naked.

a". Entire crown and whole of cheeks naked 2. Genus LIMNOGERANUS.

b". Hinter crown and hinder cheeks feathered 3. Genus LEUCOGERANUS.

b. Ears-coverts represented by a patch of feathers. 4. Genus ANTIGONE.

B. *Crown of head feathered.*c. *The head wholly feathered.*c'. *Ears-coverts represented by moderately lengthened feathers* . . . 5. GENUS TETRAPTERYX.d'. *Ears-coverts represented by a very long tuft of silky feathers.* . . . 6. GENUS ANTHROPOIDES.d. *The head with a naked region.*e'. *The naked region confined at the base of the bill* 7. GENUS BUGERANUS.f'. *The naked region extending behind the ears* 8. GENUS PSEUDOCERANUS.

1. GENUS GRUS PALLAS

Grus Pallas, *Miscell. Zool.* pp. 66-67 (1766).Synonym : *Megalornis* Gray, *List Gen. Birds* (2. ed.), p. 85 (1841).Type : *Grus grus* (Linnaeus).

Characters. Crown of head bare. Ears-coverts feathered and the cheeks feathered like them. Inner secondaries falcated and pointed, not much produced and consisting of more or less decomposed feathers. General colour grey or white.

Geographical Distribution. Europe, Northern Asia with China, Northern India and Japan, Northern Africa, Northern America from Alaska to Mexico inclusive.

KEY TO THE SPECIES AND SUBSPECIES

A. *Tail grey with or without the terminal part blackish.*a. *Throat grey.*a'. *General colour dark ashy grey including the inner secondaries* . . . 1. G. GRUS GRUS.b'. *General colour pearly grey, the inner secondaries lighter* . . . 2. G. GRUS LILFORDI.b. *Throat white.*c'. *Upper part of the neck grey.*a". *Smaller. Tarsus not more than 22 cm.* 3. G. CANADENSIS CANADENSIS.b". *Larger. Tarsus more than 25 cm.* 4. G. CANADENSIS MEXICANA.d'. *Upper part of the neck white* 5. G. MONACHUS.B. *Tail blackish.* 6. G. NIGRIFRONS.C. *Tail pure white* 7. G. JAPONENSIS.1. **Grus grus** (Linnaeus) (Plate I, Fig. 1-3).Europe, N. and N. E.
Africa*Ardea grus* Linnaeus, *Syst. Nat.* ed. x, 1, p. 141 (1758).*Grus communis* Bechstein, *Naturg. Deutschl.* Vol. 3, p. 69 (1793).*Grus cinerea* Meyer & Wolf, *Taschenk.* Vol. 2, p. 35 (1810).*Grus vulgaris* Pallas (part.), *Zoogr. Rosso-Asiat.* Vol. 2, p. 106 (1811).*Megalornis grus* Gray, *List Gen. Birds*, ed. II, p. 85 (1841).*Grus communis* Tegetmeier & Blyth, *Nat. Hist. Cranes*, p. 59 (1881).*Grus grus* Sharpe, *Cat. Birds Brit. Mus.* Vol. 23, p. 250 (1894).*Grus communis* Blauwe (part.), *Monog. Cranes*, p. 1, pl. 1 (1897).*Grus grus* Sharpe, *Hand-list Birds* Vol. 1, p. 170 (1899).2. **Grus lilfordi** Sharpe.N. Asia to N. W. E.
China and Haman*Grus vulgaris* Pallas (part.), *Zoogr. Rosso-Asiat.* Vol. 2, p. 106 (1811).*Grus longirostris* Blyth, nec Temm. & Schleg., *Birds Burm.* p. 137 (1875).*Grus communis var. orientalis* Tegetmeier & Blyth, nec Frankl., *Nat. Hist. Cranes*, p. 89 (1881).

Grus lilfordi Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 252 (1894).
Grus communis Blaauw (part.), Monog. Cranes, p. 1 (1897).
Grus lilfordi Sharpe, Hand-list Birds Vol. 1, p. 176 (1899).

3. **Grus canadensis canadensis** (Linnæus).

Ardea canadensis Linnæus, Syst. Nat. ed. x, 1, p. 141 (1858).
Grus fusca Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 558 (1817).
Grus fraterculus Baird, Cassin & Lawrence, Birds N. Am., p. 596 (1858).
Grus canadensis Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 72 (1881).
Grus canadensis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 256 (1894).
Grus canadensis Blaauw (part.), Monog. Cranes, p. 21 (1897).
Grus canadensis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).
Grus niediecki Reichenow, Ornith. Monatsber. Vol. 14, p. 256 (1906).

N. E. Siberia, Arctic
 America, W. United
 States.

4. **Grus canadensis mexicana** (P. L. S. Müller).

Ardea (Grus) mexicana P. L. S. Müller, Syst. Nat. Suppl., p. 110 (1776).
Grus poliophæa Wagler, Syst. Av. Grus sp. 7 (1827).
Grus americana Gray (part.), Gen. Birds Vol. 3, p. 552 (1845).
Grus cinerea longirostris Temminck & Schlegel, Faun. Jap., p. 117, pl. 72 (1850).
Grus canadensis Tegetmeier & Blyth (part.), Nat. Hist. Cranes, p. 72 (1881).
Grus mexicana Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 254 (1894).
Grus canadensis Blaauw (part.), Monog. Cranes, p. 21 (1897).
Grus mexicana Sharpe, Hand-list Birds Vol. 1, p. 176 (1899).

United States to Mexico

5. **Grus monachus** Temminck.

Grus monachus Temminck, Pl. Col. Vol. 5, pl. 555 (1835).
Grus monacha Tegetmeier & Blyth, Nat. Hist. Cranes, p. 71 (1881).
Grus monachus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 257 (1894).
Grus monachus Blaauw, Monog. Cranes, p. 15, pl. 4 (1897).
Grus monachus Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

E. Siberia, China, Japan.

6. **Grus nigricollis** Przevalsky.

Grus nigricollis Przevalsky, Mong. Tang. Vol. 2, p. 135 (1876).
Grus nigricollis Przevalsky, Rowley's Orn. Misc. Vol. 2, p. 436, pl. 9 (1877).
Grus nigricollis Tegetmeier & Blyth, Nat. Hist. Cranes, p. 70, pl. (1881).
Grus nigricollis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 258 (1894).
Grus nigricollis Blaauw, Monog. Cranes, p. 8, pl. 2 (1897).
Grus nigricollis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

S. W. China.

7. **Grus japonensis** (P. L. S. Müller).

Ardea (Grus) japonensis P. L. S. Müller, Syst. Nat. Suppl., p. 110 (1776).
Antigone montignesia Bonaparte, C. R. Ac. Sc. Vol. 38, p. 661 (1854).
Grus leucogeranus Dybowski & Parvex, Journ. f. Orn. 1868, p. 337.
Grus viridirostris Tegetmeier & Blyth, Nat. Hist. Cranes, p. 53 (1881).
Grus japonensis Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 258 (1894).
Grus japonensis Blaauw, Monog. Cranes, p. 2, pl. 3 (1897).
Grus japonensis Sharpe, Hand-list Birds Vol. 1, p. 177 (1899).

E. Siberia, Corea, China,
 Japan.

2. GENUS LIMNOGERANUS SHARPE

Limnogeranus Sharpe, Bull. Brit. Ornith. Club, Vol. 1, p. xxxvii (1893).

Type : *Limnogeranus americanus* (Linnæus).

Characters. Crown of head, forehead, cheeks and lores wholly devoid of feathers. Forehead provided with hair-like black bristles which hide the skin. Similar bristles on cheeks and lores but less numerous. Skin of the crown completely naked and flesh-coloured. Inner secondaries lengthened, pointed, decomposed and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Limnogeranus americanus** (Linnæus) (Plate 1, Fig. 5).

Interior of N. America,
south to Florida and
Central Mexico.

Ardea americana Linnæus, Syst. Nat. ed. x, 1, p. 142 (1758).

Grus clamator Bartram, Trav. Florida, p. 292 (1791).

Grus struthio Wagler, Syst. Av. Grus sp. 6 (1827).

Grus hoyanus Dudley, Proc. Philad. Acad. Vol. 7, p. 64 (1864).

Grus americana Tegetmeier & Blyth, Nat. Hist. Cranes, p. 54 (1881).

Limnogeranus americanus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 259 (1894).

Grus americanus Blauw, Monog. Cranes, p. 17, pl. 5 (1897).

Limnogeranus americanus Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

3. GENUS LEUCOGERANUS BONAPARTE

Leucogeranus Bonaparte, C. R. Acad. Sc. Paris, Vol. 40, p. 720 (1855).

Synonym : *Sarcogeranus* Sharpe, Bull. Brit. Orn. Club, Vol. 1, p. xxxvii (1893).

Type : *Leucogeranus leucogeranus* (Pallas).

Characters. Skin of the head devoid of feathers only on the fore part, till just behind the eyes; hinder crown and hinder cheeks consequently feathered.

Geographical Distribution. The same as that of the only Species.

1. **Leucogeranus leucogeranus** (Pallas) (Plate 1, Fig. 4).

E. Europe, N. and C. Asia,
Japan, N. W. India.

Grus leucogeranus Pallas, Reise Russ. Reichs. Vol. 2, p. 714, tab. F (1773).

Ardea gigantea S. G. Gmelin, Reise Russl. Vol. 2, p. 189 (1774).

Leucogeranus leucogeranus Bonaparte, C. R. Acad. Sc. Paris, Vol. 40, p. 720 (1855).

Grus polii Yule, Book Ser Marco Polo Vol. 1, p. 262 (1871).

Grus leucogeranus Tegetmeier & Blyth, Nat. Hist. Cranes, p. 38 (1881).

Sarcogeranus leucogeranus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 261 (1894).

Grus leucogeranus Blauw, Monog. Cranes, p. 53, pl. 14 (1897).

Sarcogeranus leucogeranus Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

4. GENUS ANTIGONE REICHENBACH

Antigone Reichenbach, Handb. Spec. Orn., p. xxiii (1852).

Synonym : *Mathewsia* Iredale, Bull. Brit. Orn. Club, Vol. 27, p. 47 (1911).

Type : *Antigone antigone* (Linnæus).

Characters. Head and upper part of neck bare, except at the ears, which are covered by a patch of feathers. Coarse granulations on the hind neck. Inner secondaries pointed, not decomposed, visibly produced beyond the primaries.

Geographical Distribution. India, Burma, Cochinchina, Malay Peninsula, Australia.

KEY TO THE SPECIES

A. Upper neck naked on a large space.

- a. A white collar round the neck. Inner secondaries white 1. A. ANTIGONE.
- b. No white collar round the neck. Inner secondaries grey. 2. A. SHARPEI.

B. Upper neck naked on a very small space.

- c. Darker above and below 3. A. RUBICUNDA RUBICUNDA.
- d. Paler above and below 4. A. RUBICUNDA ARGENTEA.

1. *Antigone antigone* (Linnaeus) (Plate 2, Fig. 1).

N. and C. India.

- Ardea antigone* Linnaeus, Syst. Nat. ed. x, 1, p. 142 (1758).
Grus collaris Boddart, Tabl. Pl. Enl., p. 52 (1783).
Grus torquata Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 566 (1817).
Grus antigone Temminck & Blyth (part.), Nat. Hist. Cranes, p. 47 (1881).
Antigone collaris Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 262 (1894).
Grus collaris Blaauw, Monog. Cranes, p. 26, pl. 7 (1897).
Antigone antigone Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

2. *Antigone sharpei* Blanford.Burma, Cochinchina,
Malay Peninsula.

- Grus antigone* Temminck & Blyth (part.), Nat. Hist. Cranes, p. 47 (1881).
Antigone antigone Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 264 (1894).
Grus (*Antigone*) *sharpei* Blanford, Bull. Brit. Orn. Club Vol. 5, p. vi (1895).
Grus antigone Blaauw, Monog. Cranes, p. 26, pl. 8 (1897).
Antigone sharpei Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

3. *Antigone rubicunda rubicunda* (Perry).

E. and S. Australia.

- Ardea rubicunda* Perry, Arcana June 1810 (*ide* Mathews, Novit. Zool. Vol. 17, p. 499, 1910).
Grus australasiana Gould, Birds Austral. Vol. 6, pl. 48 (1848).
Grus australasiana Temminck & Blyth, Nat. Hist. Cranes, p. 51 (1881).
Antigone australasiana Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 265 (1894).
Grus australasiana Blaauw, Monog. Cranes, p. 33, pl. 9 (1897).
Antigone australasiana Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).
Mathewsia rubicunda Iredale, Bull. Brit. Orn. Club Vol. 27, p. 47 (1911).

4. *Antigone rubicunda argentea* (Mathews).

N. W. Australia.

- Mathewsia rubicunda argentea* Mathews, Novit. Zool. Vol. 18, p. 227 (1912).

5. GENUS TETRAPTERYX THUNBERG

Tetrapteryx Thunberg, K. Vet. Akad. Forh. Stockh. 1818, p. 242.

Synonym : *Geyanus* Bonaparte, C. R. Acad. Sc. Paris, Vol. 38, p. 661 (1854).

Type : *Tetrapteryx paradisea* (Lichtenstein).

Characters. The head wholly feathered. Feathers of cheeks, ears and nape lengthened, dense and loose. No caruncles at the base of the bill. Innermost secondaries enormously prolonged and nearly touching the ground. Feathers of the lower throat and chest elongated and lanceolate as in Herons.

Geographical Distribution. The same as that of the only Species.

1. *Tetrapteryx paradisea* (Lichtenstein) (Plate 2, Fig. 2-3).S. Africa to Mashonaland
and Damaraland.

- Ardea paradisea* Lichtenstein, Cat. Rer. Rariss. Hamb. p. 28 (1793).
Tetrapteryx capensis Thunberg, K. Vet. Akad. Forh. Stockh. 1818, p. 242, t. 8.
Anthropoides stanleyanus Vigors, Zool. Journ. Vol. 2, p. 234, pl. 8 (1826).
Grus caffra Fritsch, Drei Jahre Sud-Afr., p. 108 (1868).
Grus paradisea Temminck & Blyth, Nat. Hist. Cranes, p. 23 (1881).
Tetrapteryx paradisea Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 268 (1894).
Anthropoides paradisea Blaauw, Monog. Cranes, p. 41, pl. 11 (1897).
Tetrapteryx paradisea Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

6. GENUS ANTHROPOIDES VIEILLOT

Anthropoides Vieillot, Analyse, p. 59 (1816).

Synonyms : *Philorchemon* Gloger, Handb. Naturg., p. 438 (1842).

Scops Gray, Gen. Birds, Vol. 3, p. 553 (1845).

Type : *Anthropoides virgo* (Linnaeus).

Characters. The head wholly feathered. The ears covered with a very long tuft of silky feathers. Feathers of the lower throat elongated and pendent. Innermost secondaries immensely elongated, falcated and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Anthropoides virgo** (Linnaeus) (Plate 2, Fig. 4).

Ardea virgo Linnaeus, Syst. Nat. ed. X. 1, p. 141 (1758).

Grus ornata Brehm, Vogelf. p. 291 (1855).

Grus virgo Tegetmeier & Blyth, Nat. Hist. Cranes, p. 26 (1881).

Anthropoides virgo Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 269 (1894).

Anthropoides virgo Blaauw, Monog. Cranes, p. 35, pl. 10 (1897).

Anthropoides virgo Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).

S. Europe, Africa to Natal,
S. W. Asia to N. China
and N. W. India.

7. GENUS BUGERANUS GLOGER

Bugeranus Gloger, Handb. Naturg., p. 440 (1842).

Synonym : *Laomedontia* Reichenbach, Handb. Spec. Orn., p. XXIII (1852).

Type : *Bugeranus carunculatus* (Gmelin).

Characters. The head wholly feathered except at the base of the bill, which is naked and warted. A feathered lapet on each side of the throat. Inner secondaries enormously produced and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Bugeranus carunculatus** (Gmelin) (Plate 2, Fig. 5).

Ardea carunculata Gmelin, Linn. Syst. Nat. ed. XIII, 1, p. 643 (1788).

Ardea palearica Forster, Descr. Anim. p. 47 (1844).

Grus carunculata Tegetmeier & Blyth, Nat. Hist. Cranes, p. 33 (1881).

Bugeranus carunculatus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 267 (1894).

Anthropoides carunculata Blaauw, Monog. Cranes, p. 45, pl. 12 (1897).

Bugeranus carunculatus Sharpe, Hand list Birds Vol. 1, p. 178 (1899).

S. Africa, W. to Congo,
E. to Shoa and Sen
liland.

8. GENUS PSEUDOGGERANUS SHARPE

Pseudogeranus Sharpe, Bull. Brit. Orn. Club, Vol. 1, p. XXXVII (1893).

Type : *Pseudogeranus leucauchen* (Temminck).

Characters. Forehead, base of the bill and region round the eyes devoid of feathers, the naked skin extending behind the ears, which are covered by a patch of feathers moderate in length as in *Antigone*. Inner secondaries moderately lengthened and pendent.

Geographical Distribution. The same as that of the only Species.

1. **Pseudogeranus leucauchen** (Temminck) (Plate 2, Fig. 6).

Grus leucauchen Temminck, Pl. Col. Vol. 3, pl. 449 (1838).

Scops ipio Gray, Gen. Birds Vol. 3, p. 555 (1845).

Grus leucauchen Tegetmeier & Blyth, Nat. Hist. Cranes, p. 35 (1881).

Pseudogeranus leucauchen Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 266 (1894).

Anthropoides leucauchen Blaauw, Monog. Cranes, p. 40, pl. 13 (1897).

Pseudogeranus leucauchen Sharpe, Hand-list Birds Vol. 1, p. 178 (1899).

E. Siberia, Europe to E.
Africa, Abyss.

B. SUBFAM. BALEARICINÆ

Only a single Genus q. GENUS BALEARICA.

9. GENUS BALEARICA BRISSON

Balearica Brisson, Orn., Vol. 5, p. 511 (1760).

Synonym : *Geranarchus* Gloger, Handb. Naturg., p. 438 (1842).

Type : *Balearica pavonina pavonina* (Linnæus).

Characters. Bill thick, a little shorter than the head. Nostrils oval and oblique. Crown of the head covered with a patch of velvety black feathers. A large tuft of straw-like bristles on the nape. Throat and sides of the face bare. Bare sides of the face particoloured white and red or pinkish. A more or less large red-coloured wattle on the lower throat. Feathers of chest and lower part of the neck lengthened, lanceolated and pendent. Inner greater wing-coverts straw-coloured and desintegrated. Innermost secondaries somewhat decomposed.

Geographical Distribution. Africa, Southern Europe accidentally, Persian Gulf?

KEY TO THE SPECIES AND SUBSPECIES

- A. *Upper part of the bare cheek-patch white, the lower part pinkish. Throat-wattle small. Neck feathers dark slaty grey.*
 - a. *Size larger. General colour lighter. Bill horn-coloured at the tip.*
White part of the bare cheek-patch larger 1. B. PAVONINA PAVONINA.
 - b. *Size smaller. General colour darker. Bill wholly black. White part of the bare cheek-patch smaller.* 2. B. PAVONINA CECILIÆ.
- B. *Bare cheek-patch white with a small upper portion red. Throat-wattle large and pendent. Neck feathers pearly grey.*
 - c. *Upper margin of the bare cheek-patch rounded* 3. B. REGULORUM REGULORUM.
 - d. *Upper margin of the bare cheek-patch with a knob-like process* 4. B. REGULORUM GIBBERICEPS.

- 1. **Balearica pavonina pavonina** (Linnæus) (Plate 3, Fig. 1). W. and Equatorial Africa.

Ardea pavonina Linnæus, Syst. Nat, ed. x, 1, p. 141 (1758).

Grus balearica Vieillot, Nouv. Dict. d'Hist. Nat. Vol. 13, p. 557 (1817).

Balearica pavonina Tegetmeier & Blyth, Nat. Hist. Cranes, p. 19 (1881).

Balearica pavonina Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 272 (1894).

Balearica pavonina Blauw, Monog. Cranes, p. 57, pl. 15 (1897).

Balearica pavonina Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).

Balearica pavonina Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 201, fig. 39.

- 2. **Balearica pavonina ceciliæ** Chalmers Mitchell (Plate 3, Fig. 2). White Nile.

Balearica ceciliæ Chalmers Mitchell, Abstr. Proc. Zool. Soc. Lond. 1904, n° 10, p. 13.

Balearica ceciliæ Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 204, fig. 40.



FAM. GRUIDÆ

1. GRUS GRUS GRUS. 2. HEAD OF GRUS GRUS GRUS. 3. FOOT OF GRUS GRUS GRUS. 4. HEAD OF LEUCOGERANUS
LEUCOGERANUS. 5. HEAD OF LIMNOGERANUS AMERICANUS.



FAM. GRUIDÆ

1. HEAD OF ANTIGONE ANTIGONE 2. TETRAPTERIX PARADISEA. 3. HEAD OF TETRAPTERIX PARADISEA. 4. HEAD OF ANTHROPOIDES VIRGO. 5. HEAD OF BUGERANUS CARUNCULATUS. 6. HEAD OF PSEUDOGERANUS LEUCAUCHEN.



FAM. GRUIDÆ

1. BALEARICA PAVONINA PAVONINA. 2. HEAD OF BALEARICA PAVONINA CECILIÆ. 3. HEAD OF BALEARICA REGULORUM REGULORUM.

3. *Balearica regulorum regulorum* (Bennett) (Plate 3, Fig. 3).

S. Africa to Uganda.

- Anthropoides regulorum* Bennett, Proc. Zool. Soc. Lond. 1833, p. 118.
Balearica chrysopelargus Tegetmeier & Blyth, Nat. Hist. Cranes, p. 15 (1881).
Balearica chrysopelargus Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 274 (1894).
Balearica regulorum Blaauw (part.), Monog. Cranes, p. 61, pl. 16 (1897).
Balearica regulorum Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).
Balearica regulorum Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 200,
 fig. 37.

4. *Balearica regulorum gibbericeps* Reichenow.

E. Africa.

- Balearica gibbericeps* Reichenow, Journ. f. Orn. 1892, p. 125.
Balearica gibbericeps Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 275 (1894).
Balearica regulorum Blaauw (part.), Monog. Cranes, p. 62 (1897).
Balearica gibbericeps Sharpe, Hand-list Birds Vol. 1, p. 179 (1899).
Balearica gibbericeps Chalmers Mitchell, Proc. Zool. Soc. Lond. 1904 Vol. 2, p. 201,
 fig. 38.

EXPLANATION OF PLATES

PLATE 1

- Fig. 1. *Grus grus grus*.
 — 2. — — — (the head).
 — 3. — — — (the foot).
 — 4. *Leucogeranus leucogeranus* (the head).
 — 5. *Limnogeranus americanus* (the head).

PLATE 2

- Fig. 1. *Antigone antigone* (the head).
 — 2. *Tetrapteryx paradisea*.
 — 3. — — — (the head).
 — 4. *Anthropoides virgo* (the head).
 — 5. *Bugeranus carunculatus* (the head).
 — 6. *Pseudogeranus leucauchen* (the head).

PLATE 3

- Fig. 1. *Balearica pavonina pavonina*.
 — 2. — — *pavonina ceciliæ* (the head).
 — 3. — — *regulorum regulorum* (the head).

Caen, 10th October 1913.

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20TH PART

CASUARII

GENERA AVIUM

CONDUCTED BY

P. WYTSMAN

WITH CONTRIBUTIONS BY MESSRS. L. BRASIL, A. DUBOIS, E. HARTERT,
C. E. HELLMAYR, Hon. W. ROTHSCHILD, T. SALVADORI, &^a

CASUARII
FAM. CASUARIIDÆ

by L. BRASIL

WITH 3 COLOURED PLATES

1913

PRICE 14/0 (FR. 17.—)



PRINTED AND PUBLISHED BY V. VERTENEUIL & L. DESMET, BRUSSELS

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FAM. CASUARIIDÆ

FAM. CASUARIIDÆ

BY L. BRASIL



THE *Casuariidæ*, or Cassowaries, show with Emeus many important points of resemblance, but they can be immediately distinguished by the more hair-like appearance of the feathers, the spine-shape of the degenerate remiges, the presence upon the head of a horny helmet, and the great development of the inner claw, so that, if Cassowaries and Emeus are united in the same Order *Casuarii* or *Casuariiformes*, they form there two very distinct Families, the *Casuariidæ* and the *Dromaiidæ*.

The different forms of Cassowaries have been studied chiefly by Sclater, Salvadori, Oustalet, and, above all, by Walter Rothschild whose splendid monograph is the finest and the most useful work made on these birds.

Characters. The *Casuariidæ* are robust and large flightless *Palæognathæ*, smaller however than Ostriches and Emeus : a full-developed individual of the tallest species stands about 150 centim. high and the dwarf form *Casuarinus casuarinus chimera* is yet as large as a turkey. The fore-limb is rudimentary, and, with the exception of four or five very modified remiges, quite undistinguishable exteriorly.

The head, moderate in size, is bare and bears a more or less high horny helmet, which is of various shapes, being laterally compressed and freely developed behind, or posteriorly depressed and then almost pyramidal, or reduced and very low. The neck is rather long, strong, and also bare on its greater part; the naked space extends more in front and behind, and, in many species, laterally very far. The head and neck naked skin is brightly and diversely coloured, mainly with blue, and much adorned with caruncles and folds in various places; in most cases the fore-neck bears one or two more or less large wattles. The naked skin shows also scattered hairs, which are chiefly numerous and strong upon the rim of the ear-opening. Eye-lashes are present and well-developed. The bill is moderate in length, generally shorter than the head, strong, laterally compressed, with the culmen curved near the tip and overlapping that of the under mandible. The nostrils are placed in a broad membranous groove; their opening is oval and relatively anterior in situation. A well-marked sternal callosity is present.

The wing is quite rudimentary; the remiges, five or six in number, are black, long, cylindrical and rigid shafts, like porcupine spines, without any indication of webs; two or three are attached to the manus and can be considered as primaries, the others being secondaries; when six of these degenerate remiges are present, the first is far the smallest; an ala spuria is wanting; the other wing feathers are not distinguishable from the general plumage; a blunt claw is often present, not always. Rectrices are not apparent, but generally the posterior body feathers are more elongated and can feign a sort of pendent tail. The tibiae are feathered, being naked only on their very extreme distal part. The metatarsi, which are shorter than in most other flightless *Palaeognathae*, are very robust and covered with variously shaped scutes, with large hexagonal ones on their greater part, with small dense roundish scales at the proximal end, with large transverse scutes below in front near the toes. The toes are three in number, of which the middle one is the longest, the inner one the smallest; they are covered with large transverse scutes; the claws are robust, the middle and outer ones curved, the inner of an unusual considerable length, straight, pointed, and constituting a powerful and dangerous weapon. The body is clothed with stiff hair-like feathers, in which the aftershaft is as long as the main shaft. Adult birds have an entirely black plumage, young ones are brown, nestlings when hatched are more or less pale brown with longitudinal black stripes.

According to Pycraft, the pterylosis shows an apterion spinale which sometimes is wanting, a more or less well-marked apterion mesogastræi including the sternal callosity and extending backwards to within a short distance of the cloacal aperture, and an apterion trunci laterale principally represented by the naked under surface of the wing. An oil gland is wanting.

The duodenum is wide and is provided with a diverticulum into which pancreatic and hepatic ducts open; the cæca are relatively short and of a uniform thickness throughout; the rectum is short and nearly straight. The right lobe of the liver is larger than the left; a spigelian lobe is present; there is a gall bladder. The lower end of the trachea is slightly dilated above the bronchi and the last few tracheal rings are incomplet behind, the space left between them being continuous with a membrana tympaniformis; there is neither pessulus nor intrinsic muscles; the outer vocal cord is well-developed. According to the high degree of degeneration of the fore-limb, the wing musculature is very reduced; the following points can be marked out: both rhomboidei are present, but they arise from ribs; the biceps originates only from the coracoid; the coraco-brachialis internus is entirely tendinous; the subscapularis arises only from the scapula. In the thigh the semitendinosus and its accessory are well-developed, the femoro-caudal is slender, its accessory is enormous in size, the ambiens, if this muscle is present, is quite reduced and imperfect. *Casuarius*, as *Dromaius*, possesses a strongly developed dermo-dorsalis. As in the *Dromaius* skull, to which that of *Casuarius* is very alike in essential characters, the vomer is of considerable length, extending forwards the distal extremity of the parasphenoidal rostrum, but it is only slightly expanded between the maxillo-palatines; the palatines are unfenestrated and anchylosed with the pterygoids and vomer; the mesethmoid, nasals, and more or less of frontals contribute to form the prominent casque. The sternum is relatively elongated and posteriorly pointed. Rudimentary clavicles are said to be present. In the pelvis, the pectineal process is not very important, the interobturator process is well-marked but do not reach the pubis, the pubis and the ischium are united at their distal extremity only by cartilage. Only one carpal, the radial, is distinguishable; the three metacarpals are wholly

fused together; the index is alone retained, being represented only by a vestigial phalanx. The femur is non-pneumatic; the ungual phalanx of the inner toe is very elongated.

The females are similar to the males but larger.

Habits and Reproduction. Cassowaries are inhabitants of wooded country, in the densest part of which they remain during the day-time. As, in addition, they are wary and timid, their habits are badly known. It seems they live usually solitary or in pairs, however small flocks can be constituted after breeding by the relatively long union of young birds with parents, and possibly also by the combination of two families. Though entirely diurnal, Cassowaries leave the cover only in the morning and evening, then they are found where they have their favourite feeding and also in the neighbourhood of water; these birds are indeed very fond of bathing, being powerful swimmers, which can cross wide rivers, and even, as it would appear, narrow sea channels. They run with great swiftness, though rather heavily, and can leap over obstacles as much as two meters high. Usually, as Emeus, they rest on the whole metatarsus. Cassowaries are very pugnacious, even both sexes fighting each other when it is not the breeding season; attacked or only angry, they kick forwards or sideways with their feet, or strike with the rigid shafts of their degenerate wings, using also the beak at the same time; the powerful claw of their inner toe makes the kicking very dangerous. According to Rothschild who has possessed and observed in life most of Cassowaries, « the voice is a curious sort of snorting, grunting, and bellowing, usually not very loud, and differing according to the species »; the note most often uttered by the male of the Australian form consists of quickly-repeated croaking sounds, audible at a considerable distance. All sort of vegetable matters are eaten, insects and crustaceans being also picked up, but fruits seem by much the preferred food. The nest is made in the densest part of the cover; it is merely a depression on the soil provided with fallen leaves and grass. The eggs, which appear to be from three to eight in number, are of a light green colour, with close-set granulations of dark bright green. The cock, it seems, incubates alone, though some say that the hen assists him, and he tends the young birds when hatched. The disproportion in the sexes pointed out by Rothschild who has found only 6 males among 180 living Cassowaries secured in the usual manner « by shooting the old male and catching his brood of chicks when still in down », is really a very conspicuous thing if the duties of incubation are performed solely by the cock and if only one female lays in each nest.

Range. Moluccan and Papuan Sub-Regions, Northern Australia.

Bibliography. Salvadori, Mem. R. Accad. Sc. Torino (2), Vol. 34, pp. 173-217 (1881); Ornith. Papuasie e Molucche, Vol. 3, pp. 473-503 (1882); Cat. Birds Brit. Mus. Vol. 27, pp. 590-602 (1895); Chalmers Mitchell, Proc. Zool. Soc. Lond. 1896, p. 140; Oustalet, Nouv. Arch. Mus. Hist. Nat. Paris (3), Vol. 8, pp. 263-267 (1896); Beddard, Structure and Classification of Birds, pp. 493-528 (1899); Sharpe, Hand-list Birds, Vol. 1, pp. 3-4 (1899); Rothschild, Proc. Zool. Soc. Lond. 1899, pp. 773-776; Rothschild & Pycraft, Trans. Zool. Soc. Lond. Vol. 15, pp. 109-290 (1900); Meyer, Ibis (8), Vol. 1, pp. 194-196 (1901); Matschie, Journ. f. Ornith. Vol. 49, pp. 265-267 (1901); Rothschild, ibidem, pp. 360-361 (1901); Bull. Brit. Ornith. Club, Vol. 14, pp. 38-40 (1904); ibidem, Vol. 15, pp. 32-33 (1905); Novit. Zool. Vol. 14, pp. 504-505 (1907); van Oort, Notes Mus. Leyden, Vol. 29, pp. 204-206 (1908); Rothschild, Novit. Zool. Vol. 15, p. 392 (1908); Mathews, Birds Australia, Vol. 1, pp. 27-34 (1910); Ogilvie-Grant, Bull. Brit. Ornith. Club, Vol. 29, p. 25 (1911); Rothschild, ibidem, pp. 40-52 (1912); Verhändl. V. Intern. Ornith. Kongr. Berlin, pp. 144-150 (1912); Dubois, Bull. Soc. Zool. France, Vol. 38, pp. 104-113 (1913).

The *Casuaridae* consist of a single Genus.

GENUS CASUARIUS BRISSON

Casuarius Brisson, Ornith. Vol. 5, p. 10 (1760).

Synonyms : *Rhea* Lacépède (non Latham), Mém. Inst. Fr. Paris, Vol. 3, p. 519 (1801).

Cela Oken, Lehrb. Naturgesch. Vol. 3, Zool. (2) p. 646 (1816) (*Cela* Moehring, Geslacht. Vogelen, p. 43, 1758).

Oxyporus Brookes, Catal. Mus. J. Brookes, Pt. 2, p. 95 (1828).

? *Thrasys* Billberg, Syn. Faunæ Scand. Vol. 1, Pars 2, tab. A (1828).

Hippalectryo Gloger, Hand- u. Hilfsb. p. 452 (1842).

Type : *Casuarius casuarius casuarius* (Linnaeus).

Characters. The same as those of the Family.

Geographical Distribution. Moluccan and Papuan Sub-Regions, Northern Australia.

KEY TO THE SPECIES AND SUBSPECIES

A. Only two wattles, which are on the same level.

a. Very small, as a turkey. 9. *C. CASUARIUS CHIMÆRA*.

b. Larger, at least as a *Rhea*.

a'. Wattles close together.

a''. Size large.

a'''. Wattles very large, above 125 mm.

long.

a⁴. Sides of neck anteriorly bright

blue 7. *C. CASUARIUS SCLATERI*.

b⁴. Sides of neck anteriorly bluish

purple 8. *C. CASUARIUS JOHNSONII*.

b'''. Wattles middle-sized, at most 80 mm.

long.

c⁴. Casque low, but very large; sides

of neck anteriorly blue, poste-

riorly scarlet

2. *C. CASUARIUS BECCARII*.

d⁴. Casque low, not very large.

a⁵. Sides of neck anteriorly

purplish blue, poste-

riorly red

1. *C. CASUARIUS CASUARIUS*.

b⁵. Sides of neck anteriorly

purplish mauve, poste-

riorly scarlet

5. *C. CASUARIUS VIOLICOLLIS*.

b''. Size relatively small.

c'''. Casque very high

6. *C. CASUARIUS ALTIJUGUS*.

d'''. Casque middle-sized.

e⁴. A fleshy-red ridge on each side

of foreneck

4. *C. CASUARIUS BISTRIATUS*.

f⁴. No ridges on foreneck

3. *C. CASUARIUS SALVADORII*.

b'. Wattles far apart on the sides of the neck

10. *C. BICARUNCULATUS*.

B. *A single wattle at the inferior edge of the foreneck without or with additional wattles.*

c. *Without additional wattles.*

c'. *Foreneck orange or yellow.*

c''. *No yellow occipital patch* 11. C. UNAPPENDICULATUS UNAPPENDICULATUS.

d''. *A yellow occipital patch.*

e'''. *Casque depressed posteriorly.*

g⁴. *Casque low* 12. C. UNAPPENDICULATUS ROTHSCHILDI.

h⁴. *Casque very high* 13. C. UNAPPENDICULATUS OCCIPITALIS.

f'''. *Casque not depressed posteriorly* 15. C. UNAPPENDICULATUS AURANTIACUS.

d'. *Foreneck crimson.*

e''. *Casque depressed* 16. C. UNAPPENDICULATUS SUFFUSUS.

f''. *Casque very high* 18. C. UNAPPENDICULATUS MITRATUS.

e'. *Foreneck blue.*

g''. *Sides of neck entirely blue* 14. C. UNAPPENDICULATUS IAGLAIZEI.

h''. *Sides of neck inferiorly crimson* 19. C. PHILIPPI.

f'. *Foreneck blue and red* 17. C. UNAPPENDICULATUS RUFOTINCTUS.

d. *With one or two additional wattles.*

g'. *A small additional wattle above the principal one.* 20. C. DOGGETTI.

h'. *A pair of additional wattles.*

i''. *Foreneck blue; sides of neck purple* 21. C. JAMRACHI.

j''. *Foreneck yellow; sides of neck yellow* 22. C. HAGENBECKI.

C. *No wattle, only sometimes a small knob on the naked part of the foreneck.*

e. *Front of the neck pink or rosy-red.*

i'. *Foreneck entirely pink; hindneck yellow* 28. C. ROSEIGULARIS.

j'. *Foreneck partly pink or rosy-red; hindneck not yellow.*

k''. *Foreneck pink and scarlet* 29. C. LORIÆ.

l''. *Front of the neck almost entirely covered by a large rosy-red patch* 30. C. KEYSSERI.

f. *Front of the neck blue or violet-blue.*

k'. *Hindneck not entirely blue.*

m''. *Occiput and sides of the face black; lower part of the hindneck orange-chrome* 25. C. CLAUDII.

n''. *Occiput and sides of the face white; lower part of the hindneck scarlet.*

g'''. *No black and pink patch below ear* 23. C. PAPUANUS PAPUANUS.

h'''. *A black and pink patch below ear* 24. C. PAPUANUS EDWARDSI.

l'. *Hindneck entirely blue.*

o''. *Head whitish-blue.*

i'''. *Foreneck blue with a red patch in centre* 26. C. PICTICOLLIS PICTICOLLIS.

j'''. *Foreneck blue without a red patch* 27. C. PICTICOLLIS HECKI.

p''. *Head dark blue.*

- 1st. Foreneck without a round dark crimson patch 31. C. BENNETTI BENNETTI.
 1st. Foreneck with a round dark crimson patch 32. C. BENNETTI MACULATUS

1. **Casuarus casuarus casuarus** (Linnaeus) (Plate 1, Fig. 1-4; Plate 2, Fig. 1).

- Siralio casuarus* Linnaeus, Syst. Nat. Ed. 10, 1, p. 155 (1758).
Casuarus galeatus Bonaterre, Enc. Méth. Vol. 1, p. 4, pl. 14, fig. 2 (1790).
Casuarus galeatus Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 592 (1895).
Casuarus casuarus Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus casuarus Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 113, pl. 22 (1900).
Casuarus casuarus casuarus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 161 (1912).
Casuarus casuarus Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

Wakan Island, Aru Islands.

2. **Casuarus casuarus beccarii** Sclater.

- Casuarus beccarii* Sclater, Proc. Zool. Soc. Lond. 1875, p. 87, fig. 1-2 (p. 86).
Casuarus beccarii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 596 (1895).
Casuarus beccarii Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus casuarus beccarii Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 116, pl. 23 (1900).
Casuarus casuarus beccarii Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus casuarus beccarii Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

3. **Casuarus casuarus salvadorii** Oustalet (Plate 2, Fig. 4).

- Casuarus salvadorii* Oustalet, Bull. Assoc. Sc. France, n° 539, p. 350 (1878).
Casuarus salvadorii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 595 (1895).
Casuarus salvadorii Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus casuarus salvadorii Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 120, pl. 24 (1900).
Casuarus casuarus salvadorii Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus bicarunculatus salvadorii Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

Coast of Geelvink Bay, N. W. New Guinea.

4. **Casuarus casuarus bistratus** van Oort.

- Casuarus casuarus bistratus* van Oort, Notes Leyden Mus. Vol. 29, p. 204, pl. 8 (1907).
Casuarus casuarus bistratus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus casuarus altijugus Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

Coast of central New Guinea.

5. **Casuarus casuarus violicollis** Rothschild.

- Casuarus casuarus violicollis* Rothschild, Bull. Brit. Ornith. Club, Vol. 8, p. 27 (1899).
Casuarus violicollis Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus casuarus violicollis Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 122, pl. 26 (1900).
Casuarus casuarus violicollis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus casuarus violicollis Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

Trangan Island, Aru Islands.

6. **Casuarus casuarus altijugus** Sclater (Plate 2, Fig. 3).

- Casuarus altijugus* Sclater, Nature, Vol. 17, p. 375 (1878).
Casuarus salvadorii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 595 (1895).
Casuarus casuarus intensus Rothschild, Bull. Brit. Ornith. Club, Vol. 8, p. 21 (1899).
Casuarus intensus Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarus casuarus intensus Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 121, pl. 27 (1900).
Casuarus casuarus altijugus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarus casuarus altijugus Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).

Arfak Peninsula, N. W. New Guinea.

7. **Casuarius casuarius sclateri** Salvadori, S. E. New Guinea.
Casuarius sclateri Salvadori, Ann. Mus. Stor. Nat. Genova, Vol. 12, p. 422 (1878).
Casuarius beccarii Salvadori (part.), Cat. Birds Brit. Mus. Vol. 27, p. 596 (1895).
Casuarius casuarius sclateri Rothschild, Trans. Zool. Soc. Lond. Vol. 15, p. 118, fig. 1 (1900).
Casuarius casuarius sclateri Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarius casuarius sclateri Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
8. **Casuarius casuarius johnsonii** F. Müller, (Plate 2, Fig. 2). North Queensland.
Casuarius australis Wall (non Shaw), Sydney Herald 3rd June 1854.
Casuarius johnsonii Müller, Proc. Zool. Soc. Lond. 1867, p. 242.
Casuarius australis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 594 (1895).
Casuarius australis Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Casuarius casuarius australis Rothschild, Trans. Zool. Soc. Lond. p. 123, pl. 25 (1900).
Casuarius casuarius australis Mathews, Birds Australia, Vol. 1, p. 28, pl. 5 (1910).
Casuarius casuarius australis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Casuarius casuarius johnsonii Rothschild, Bull. Brit. Ornith. Club, Vol. 29, p. 52 (1912).
Casuarius casuarius johnsonii Mathews, Novit. Zool. Vol. 18, p. 176 (1912).
9. **Casuarius casuarius chimæra** Rothschild, German New Guinea.
Casuarius casuarius chimæra Rothschild, Bull. Brit. Ornith. Club, Vol. 14, p. 39 (1904).
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FAM. CASUARIIDÆ

1. CASUARIUS CASUARIUS CASUARIUS. 2. BILL OF CASUARIUS CASUARIUS CASUARIUS. 3 BILL OF CASUARIUS CASUARIUS CASUARIUS. 4. FOOT OF CASUARIUS CASUARIUS CASUARIUS. 5. HEAD OF CASUARIUS UNAPPENDICULATUS UNAPPENDICULATUS.



FAM. CASUARIIDÆ

1. HEAD OF CASUARIUS CASUARIUS CASUARIUS. 2. HEAD OF CASUARIUS CASUARIUS JOHNSONII. 3. HEAD OF CASUARIUS CASUARIUS ALTIJUGUS. 4. HEAD OF CASUARIUS CASUARIUS SALVADORII. 5. HEAD OF CASUARIUS JAMRACHI. 6. HEAD OF CASUARIUS BICARUNCULATUS.



FAM. CASUARIIDÆ

1. HEAD OF CASUARIUS UNAPPENDICULATUS ROTHSCHILD. 2. HEAD OF CASUARIUS UNAPPENDICULATUS OCCIPITALIS.
 3. HEAD OF CASUARIUS DOGGETTI. 4. HEAD OF CASUARIUS PAPUANUS PAPUANUS. 5. HEAD OF CASUARIUS LORLÆ.
 6. HEAD OF CASUARIUS BENNETTI BENNETTI.

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EXPLANATION OF PLATES

PLATE 1

Fig. 1. *Casuarius casuarius casuarius*.

- 2. — — — (the bill).
- 3. — — — (the head, anterior part).
- 4. — — — (the right foot, inside view).
- 5. — unappendiculatus unappendiculatus (the head).

PLATE 2

Fig. 1. *Casuarius casuarius casuarius* (the head).

- 2. — — johnsonii (the head).
- 3. — — altijugus (the head)
- 4. — — salvadorii (the head).
- 5. — jamrachi (the head).
- 6. — bicarunculatus (the head).

PLATE 3

Fig. 1. *Casuarius unappendiculatus rothschildi* (the head).

- 2. — — occipitalis.
- 3. — doggetti (the head).
- 4. — papuanus papuanus (the head).
- 5. — loriæ (the head).
- 6. — bennetti bennetti.

(The figures of plates 2 and 3 after W. Rothschild's works).

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FAM. RHINOCETIDÆ

FAM. RHINOCHETIDÆ

BY L. BRASIL



THIS Family contains an only Bird, the New Caledonian Kagu, which presents a very special association of characters and is considered as an old form, what it seems to be really. However Kagu is somewhat allied, though not very closely, to Cranes and above all to American Sun-Bittern. Therefore *Rhinochetidæ* are included as these last Birds in the Order *Grues*, *Gruiformes* or *Alectorides*.

Characters. — The size is about that of a domestic fowl. The head is large, the neck strong and rather short, the legs are long. The bill is a little longer than the head, strong compressed, the culmen flat on about two third of its way from the base, rounded on the last third and here rather arched. On each side of the maxilla is a wide and deep furrow, long about as the half of the bill, with at the base a very peculiar horned opercule, which conceals the nostril and is said to protect it when the bird rummages the earth for worms. The mandible is devoid of lateral grooves. The eye is very large. Behind the head, feathers are very elongated — the longest measure 10 or 12 cm. —, and form a pendent tuft which is erected in angry, fright or any other excitement. The wings are moderate, broad, and rounded; the primaries are ten in number, the first is the shortest, the fifth the longest; the inner secondaries, which are thirteen in number, exceed the primaries. The tail is rather long, wide, and rounded, with twelve rectrices. The legs are long and slender. The tibiæ are partly bare. The tarsi present in front large and high transverse scutes, smaller scales behind. Toes are four in number; the hallux is rather long and elevated; claws are arched and sharp. Feathers are somewhat desintegrated and they have a large aftershaft. In adults, down covers the whole surface. The general coloration is slaty grey, with the wings and tail obscurely barred.

In opposition with the *Gruidæ*, but as in the *Eurypygidæ* and *Mesanatidæ*, powder-down patches exist and the present oil gland is nude. Powder-down patches have a very

special disposition : they are profusely scattered over the body. The pterylosis is described by Forbes as follows : On the neck the dorsal tract is double and continues so until its termination about on a level with the anterior end of the scapulæ ; the posterior portion of the dorsal tract, which is quite separate from the anterior portions, is only forked to a slight extent anteriorly and widely dilated mesially. The ventral tract is broken up into two and the pectoral branch is likewise quite separated from the main tract, what seems special to *Rhinochetos* and *Mesanas*. The humeral tract is perfectly free from the inferior one. The characters of the pterylosis of *Rhinochetos* seems to be indebted for much to the presence of the scattered powder-down patches.

The musculature has been carefully studied by Beddard. The semitendinosus, its accessory, the femoro-caudal, and the ambiens are all present; the semitendinosus is inserted in common with the semimembranosus; both peroneals are present; the flexor hallucis supplies the hallux alone; the tendon of the tensor patagii brevis divides into three branches, the two inner of which are prolonged some way beyond the tendon of the extensor metacarpi radialis longi, to which they are first of all attached; there is a biceps slip and an accessory biceps, which arises from the humerus just below the insertion of the deltoid, and is inserted near the insertion of the biceps; the expansor secundariorum is present.

The cervical vertebræ are sixteen in number, the two last of which can be provided with movable ribs. Four dorsal vertebræ are ankylosed. Five ribs articulate with the sternum. The sternum is weak, narrow, and posteriorly unnotched; its keel is small. The pelvis is broad. The furcula is weak and U-shaped. The pelvis is broad. The anterior furrow of the metatarsus is broad and very deep. The skull is schizorhinal and incompletely desmognathous; the orbit is very large with the edge prominent and sharp; the interorbital septum is largely fenestrated; there are no basipterygoid processes; a partial bony internasal septum is present; the palatines are abruptly truncated posteriorly; there are small occipital foramina.

Habits and Reproduction. Kagus are solitary birds; they can be found in small flocks only in the sun-rise. They are looking grave and sad, standing often motionless, crookbacked, the neck shortened. They inhabit dark woods and in the fern near the sea-shore, but also, in the interior of their native island, wild ravines, craggy places, and the top of the hills. Sleeping during the day-time, they become active in the evening, then feeding upon snails, insects, frogs, and mainly upon worms, which are cleverly picked from earth. Kagus walk quickly and then stand for a long time motionless; they can run very rapidly, the body carried after the manner of a Rail and often wings expanded. When excited, they execute gesticulations or take attitudes in a way that no other bird is known to do. The flight is heavy and low; the bird rises only when it cannot do otherwise. The voice is loud, piercing and yelp-like; it is heard usually about daybreak when the birds are assembled.

The nest is made on the ground in a hole provided with sprigs and leaves. A single egg is laid; it is elliptical in shape, stony-grey in colour with spots and blotches of dull grey; the surface is slightly glossy and the shell comparatively fine. The nestling is covered with down and has a variegated coloration.

Range. Only one Species confined to New Caledonia.



FAM. RHINOCETIDÆ

1. RHINOCETOS JUBATUS. 2. HEAD OF RHINOCETOS JUBATUS. 3. FOOT OF RHINOCETOS JUBATUS. 4. WING OF RHINOCETOS JUBATUS.

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GENUS RHINOCHETOS J. VERREAUX ET DES MURS

Rhinochetos J. Verreaux et des Murs, Rev. et Mag. de Zool. 2^e Sér. Vol. 12, p. 439 (1860).

Type : *Rhinochetos jubatus* J. Verreaux et des Murs.

Characters and Geographical Distribution. The same as those of the Family.

1. **Rhinochetos jubatus** J. Verreaux et des Murs (**Plate, Fig. 1, 2, 3, 4**). New Caledonia.

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EXPLANATION OF PLATE

Fig. 1. *Rhinochetos jubatus*.

— 2.	—	—	(the head).
— 3.	—	—	(the right foot).
— 4.	—	—	(the wing).

Caen, 15th October 1913.

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FAM. APTERYGIDÆ

BY L. BRASIL



THE *Apterygidæ*, or Kiwis, are Birds of the Sub-Class *Palæognathæ*. The system of classification by which Kiwis and Moas constitute in this Sub-Class a single Order *Apteryges* or *Apterygiformes*, with two Sub-Orders, *Apterygines* and *Immanes*, seems to us the most natural and we have adopted it. The Sub-Order *Apterygines* includes only the one Family *Apterygidæ*.

Characters. About the size of a large domestic fowl, or a little more, Kiwis are the smallest of the living *Ratitæ*; they differ from other such birds, amongst other things, by the presence of a back toe, by the very remarkable position of the nostrils at the tip of the bill, and by the relatively enormous size of the eggs.

The bill is very long, slender, weak, grooved at the sides, a little arched near the tip, with a hard bony cere at the base; the upper mandible, at its extremity, projects over the lower and consequently constitutes alone the tip of the bill. The nostrils are small, sub-linear, placed, as it is said above, near the very end of the long bill, but laterally and a little underneath. The neck is short and strong. The wings, which are in an extremely aborted condition and covered with body feathers, are functionless and invisible exteriorly, but they have rudimentary remiges, apparently thirteen or fourteen in number; the manus bears a claw. The legs are very thick and situated backwardly; the tibiæ are feathered; the metatarsi, which are as long as the middle toe, are clothed with variously sized scutes, those in front of the lowest part are the largest and transverse. The toes are four in number owing to the fore-mentioned hallux, which is small and elevated; the front toes are robust, covered with broad scutes and provided, like the back one, with strong, long and sharp claws. The tail devoid of distinct rectrices is rudimentary and not apparent. The feathers, constituting a soft and loose plumage, are narrow, lanceolate, and composed of long desunited barbs or filaments; they have no aftershaft; many elongated hairs occur on the front of the head and the sides of the face; apteria mesogastræi and trunci laterali are present and well marked. There is a large and peculiar oil gland, which is nude or with two minute feathers.

The small intestine is relatively long and narrow; the large intestine is short; the cæca

are moderate in length and they are dilated in their terminal half. The left liver-lobe is larger than the right; the gall bladder is occasionally wanting; the hepatic and pancreatic ducts open separately in the duodenum. The posterior intermediate and abdominal air-sacs are small and quite exceptionally they are enclosed within the sub-pulmonary chamber. There is only one carotid, the left. Alone amongst the *Ratitæ*, *Apterygidæ* have retained the following muscles, the serratus metapatagialis, the latissimus dorsi metapatagialis, and the pectoralis abdominalis; on the other hand, only here the latissimus dorsi anterior is wanting; the rhomboideus profundus is also absent; in the leg the most variable muscles are all present. The skull is very elongated in its anterior part and rounded posteriorly; the post-orbital processes are entirely absent; the lacrymal is vestigial; the frontal do not form a sharp edge to the orbit; the vomer is fused with the pterygoid and palatine; the quadrate has a two-headed process; the symphysis of the mandible is very long, about half of the length of the ramus. The sternum, variable in form and proportions, is a small quadrate bone with a wide anterior emargination and rather deep notches posteriorly, caused by the projection of the posterior lateral processes; it is usually quite smooth, but sometimes presents « a low ridge nearly as well marked as the vestigial keel of *Stringops* » (Parker). The clavicles are absent. The wing is small-boned and shows in the structure of the manus various degrees of degeneration; a single digit is present, the index, which has two or three phalanges and is clawed. The pre-acetabular part of the ilium is exceptionally long; posteriorly the ilium and ischium are widely separated; the pubis never fuses with the ischium at its free extremity; the interobturator process is very small and do not meet with the pubis; the pectineal process is large and pointed. The femur is relatively large and more slender than in any other living *Ratitæ*. All the phalanges are moderate in length.

The female is nearly similar to the male but larger.

Habits and Reproduction. Kiwis are swift running birds, only active in the night, hidden, during the day-time, in natural cavities or holes burrowed by themselves. They inhabit wooded country and high hills. Their food consists chiefly of earthworms, for seeking which in the ground the bill is remarkably adapted, but insects, molluscs, and berries are also eaten. Kiwis are very pugnacious and make good use of their powerful legs in kicking at any object approaching them closely. The cry is a high shrill whistle or a low hoarse note; sometimes a low cackling or grunting noise is heard. The female alone makes the nesting place; it is usually an excavation among the roots of a tree fern or a hole which she finds ready made in the ground, but sometimes she burrows it with her claws, without any assistance of her mate. The eggs are generally two in number; they are elliptical in form and abnormally big: an egg of Mantell's Kiwi can measure 134 by 73 millim.; the shell is smooth, very thin, pure white, or with a slightly greenish grey tint. The male performs all the duties of incubation and takes entire charge of the young birds till they are able to shift for themselves.

Unfortunately Kiwis are now vanishing birds. They are however protected by law, but the voluntary introduction into New Zealand of polecats, stoats, and weasels, in the hope of suppressing rabbits, has been for them a dreadful thing, which will make more early their whole extermination; shortly, it seems, Kiwis will have to undergo the regretful fate of their compatriots and nearest allies, the quite extinct Moas.

Range. This Family is entirely confined to New Zealand.



FAM. APTERYGIDÆ

1. APTERYX AUSTRALIS AUSTRALIS. 2. BILL OF APTERYX AUSTRALIS AUSTRALIS. 3. TIP OF THE BILL OF APTERYX AUSTRALIS AUSTRALIS. 4. HEAD OF APTERYX OWENI OWENI. 5. FOOT OF APTERYX OWENI OWENI.

Bibliography. Buller, Hist. Birds New Zealand 2nd. Ed. Vol. 2, pp. 308-332 (1888); Parker, Phil. Trans. Vol. 182, pp. 25-134 (1891); Rothschild, Bull. Brith. Ornith. Club, Vol. 1, pp. 59-62 (1893); Salvadori, Cat. Birds Brit. Mus. Vol. 27, pp. 603-612 (1895); Rothschild and Beddard, Novit. Zool. Vol. 6, pp. 361-402 (1899); Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899); Pycraft, Trans. Zool. Soc. Lond. Vol. 15, pp. 149-290 (1900); Buller, Suppl. Birds New Zealand, Vol. 1, pp. 1-36 (1905); Rothschild, Verhandl. V. Intern. Ornith. Kongr. pp. 152-153, 157, 163 (1912).

The *Apterygidae* consist of a single Genus.

GENUS APTERYX SHAW

Apteryx Shaw, Nat. Misc. Vol. 24, pl. 1057-1058 (1813).

Synonym : *Apterynx* Swainson, Nat. Hist. and Class. Birds, Vol. 2, p. 346 (1837).

Type : *Apteryx australis australis* Shaw.

Characters. The same as those of the Family.

Geographical Distribution. New Zealand : North and South Islands, Stewart Island.

KEY TO THE SPECIES AND SUBSPECIES

A. General plumage brown. The feathers of the upper parts longitudinally striped.

a. Size smaller; culmen, less than 170 mm.

a'. Lighter, more greyish. Feathers of the neck softer 1. A. AUSTRALIS AUSTRALIS.

b'. Darker, more brown. Feathers of the hind neck harsh 2. A. AUSTRALIS MANTELLI.

b. Size larger; culmen, till 200 mm. 3. A. AUSTRALIS LAWRYI.

B. General plumage greyish. The feathers transversally barred.

c. Size smaller. Plumage lighter. Light bars narrower.

c'. Smaller. Dark bars of the feathers lighter 4. A. OWENI OWENI.

d'. Larger. Dark bars of the feathers heavier, more conspicuous 5. A. OWENI OCCIDENTALIS.

d. Size larger. Plumage darker. Light bars wider 6. A. OWENI HAASTI.

1. *Apteryx australis australis* Shaw (Plate, Fig. 1-3).

South Isl., New Zealand.

Apteryx australis Shaw, Nat. Misc. Vol. 24, pl. 1057-1058 (1813).

Apteryx australis Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 322 (1888).

Apteryx australis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 604 (1895).

Apteryx australis Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).

Apteryx australis Rothschild (part.), Novit. Zool. Vol. 6, p. 362 (1899).

Apteryx australis Buller, Suppl. B. New Zeal. Vol. 1, p. 2 (1905).

Apteryx australis australis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

2. *Apteryx australis mantelli* Bartlett.

North Isl., New Zealand.

Apteryx mantelli Bartlett, Proc. Zool. Soc. Lond. 1850, p. 275, pl. 30, fig. 3-4, pl. 31, fig. 2.

Apteryx bulleri Sharpe, Proc. Wellington Phil. Soc. 1885, p. 6.

Apteryx bulleri Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 308, pl. (1888).

Apteryx mantelli Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 607 (1895).

Apteryx mantelli Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).

Apteryx australis mantelli Rothschild, Novit. Zool. Vol. 6, p. 369, pl. 10 (1899).

Apteryx mantelli Buller, Suppl. B. New Zeal. Vol. 1, p. 12 (1905).

Apteryx bulleri Buller, ibidem, p. 17 (1905).

Apteryx australis mantelli Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

3. *Apteryx australis lawryi* Rothschild.

Stewart Isl., New Zealand.

Apteryx maxima Buller, Trans. New Zeal. Inst. Vol. 23, p. 602 (1891).

Apteryx lawryi Rothschild, Bull. Brit. Ornith. Club, Vol. 1, p. 61 (1893).

- Apteryx lawryi* Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 606 (1895).
Apteryx lawryi Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx australis Rothschild (part.), Novit. Zool. Vol. 6, p. 362, pl. 9 and 14 (1899).
Apteryx lawryi Buller, Suppl. B. New Zeal. Vol. 1, p. 1, fig. pp. 9-10 (1905).

4. *Apteryx oweni oweni* Gould (Plate, Fig. 4-5).

South Isl., New Zealand.

- Apteryx owenii* Gould, Proc. Zool. Soc. Lond. 1847, p. 94.
Apteryx oweni Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 327, pl. (1888).
Apteryx oweni Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 609 (1895).
Apteryx oweni Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx oweni Rothschild, Novit. Zool. Vol. 6, p. 383, pl. 11 (1899).
Apteryx oweni Buller, Suppl. B. New Zeal. Vol. 1, p. 19, fig. p. 22 (1905).
Apteryx oweni oweni Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

5. *Apteryx oweni occidentalis* Rothschild.

North Isl. (Mount Hector, Tararua Ranges) and South Isl. (west coast), New Zealand.

- Apteryx oweni* Buller (part.), Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 328 (1888).
Apteryx occidentalis Rothschild, Bull. Brit. Ornith. Club, Vol. 1, p. 61 (1893).
Apteryx occidentalis Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 610 (1895).
Apteryx occidentalis Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx oweni occidentalis Rothschild, Novit. Zool. Vol. 6, p. 384, pl. 12 (1899).
Apteryx occidentalis Buller, Suppl. B. New Zeal. Vol. 1, p. 23 (1905).
Apteryx oweni occidentalis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 153 (1912).

6. *Apteryx oweni haasti* Potts.

South Isl. (Southern Alps, west coast), New Zealand.

- Apteryx haasti* Potts, Trans. New Zeal. Inst. Vol. 4, p. 204 (1872).
Apteryx haasti Buller, Hist. B. New Zeal. 2nd. Ed. Vol. 2, p. 330 (1888).
Apteryx haasti Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 611 (1895).
Apteryx haasti Sharpe, Hand-list Birds, Vol. 1, p. 7 (1899).
Apteryx haasti Rothschild, Novit. Zool. Vol. 6, p. 381, pl. 13 (1899).
Apteryx haasti Buller, Suppl. B. New Zeal. Vol. 1, p. 25, pl. 1 (1905).
Apteryx haasti Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 152 (1912).

EXPLANATION OF PLATE

Fig. 1. *Apteryx australis australis*.

- 2. — — — (the bill).
 — 3. — — — (the extremity of the bill, from above).
 — 4. — — — *oweni oweni* (the head).
 — 5. — — — (the left foot).
-

Caen, 15th October 1913.

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FAM. CHAMÆIDÆ

BY C. E. HELLMAYR

Chamæidæ Ridgway, Bull. U. S. Nat. Mus. no. 50, Vol. 3, 1904, p. 683-691.

Characters 1). Bill much shorter than head, about equal to middle toe without claw, at base decidedly wider than deep; culmen strongly curved; maxillary tomium slightly concave for terminal half, without subterminal notch; gonys slightly convex, its basal angle directly beneath the anterior end of nasal fossae. In general form, the bill is not unlike that of the parine genus *Ægithalos*, being, however, relatively longer and stouter, more compressed towards tip and more acute. Nasal fossae very large, entirely unfeathered; nostrils large, overhung by a broad, somewhat elevated, operculum which, as in *Certhiidae*, does not reach to anterior end of nasal fossae. Rictal bristles well developed; feathers of chin and upper throat terminated by distinct, though rather fine bristles. Wing short and much rounded; sixth and seventh primaries longest, fifth scarcely shorter; first primary about two-thirds of second; third equal in length to secondaries while the second primary is much shorter than the latter. Tail much longer than wing, much graduated; the two middle pairs about equal in length, the third but little shorter, the outermost somewhat more than half as long as median rectrix; rectrices rather narrow, of nearly equal width, tips very much rounded. Tarsus very long (nearly half as long as wing); acrotarsium encroaching but little on outer side of tarsus, divided into eight scutes, of which the third, fourth and fifth, from above, are much the longest; middle toe without claw more than half as long as tarsus, its basal phalanx adherent for half its length to outer toe, less adherent to inner toe; outer toe slightly longer than inner one; hallux about equal in length to inner toe, but much stouter, its claw decidedly shorter than the digit. Wing 54-63; tail 73-90; bill about 10-12 mm.

1) The characters of this family have been taken from Ridgway's great work.

Coloration. Dull brown above, sometimes rather greyish on head; beneath buffy or pale cinnamonaceous, obsoletely streaked with greyish on throat and chest; plumage very lax and soft, pileum slightly crested. Sexes alike.

Geographical Distribution. California and Oregon, Western United States.

Observations. Although the characters of the single genus are mainly intermediate between those of the *Paridae* (Tits) and *Troglodytidae* (Wrens) it cannot be referred to either of them, and constitutes a rather isolated type among the *Oscines*. From the investigations of F. A. Lucas 1) and R. W. Shufeldt 2) it would seem that the Wren-Tits, in osteological structure, come nearest to *Psaltiriparus*.

Habits and Nidification. The members of the genus are terrestrial birds, living in shrubberies of hill- and mountain slopes. The male is said to have a very sweet, trilling song. The cup-shaped nest is placed, in low bushes, on or near the ground and contains three to five, uniform pale blue eggs.

Monotypic. One species with four subspecies.

GENUS CHAMÆA GAMBEL

1847. **Chamæa** Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 3, p. 154 (Sp. un. : *Chamaea fasciata* Gambel).

Characters. The same as those of the family.

KEY TO THE SUBSPECIES OF CHAMÆA FASCIATA

1. *Darker : the back etc. sepia brown or sooty, the under parts ruddy cinnamon* 2.
- *Paler : the back etc. clearer, more greyish brown, the under parts pale buffy-or vinaceous cinnamon* 3.
2. *Darker : the back dark sepia brown or sooty, the under parts deeper vinaceous or fawn colour.* 3. *C. FASCIATA PHEA.*
- *Paler : the back clearer sepia brown, the under parts lighter vinaceous cinnamon.* 2. *C. FASCIATA RUFULA.*
3. *Darker : the back browner under parts, deeper cinnamonaceous,* 1. *C. FASCIATA FASCIATA.*
- *Paler : the back more greyish, under parts paler, more buffy.* 4. *C. FASCIATA HENSHAWI.*

1. *Chamæa fasciata fasciata* (Gambel).

Parus fasciatus Gambel, Proc. Acad. Nat. Sc. Philad. Vol. 2, p. 265 (1845) (California; type in U. S. Nat. Mus. Wash. stated by Ridgway to belong to the present form; cfr. Ridgw., Birds North & Middle America, Vol. 3, 1904, p. 687).

Chamaea fasciata intermedia Grinnell, Condor, Vol. 2, p. 86 (1900) (Palo Alto, Santa Clara Co., California).

Fig. Journ. Acad. Nat. Sc. Philad. (2 ser.), Vol. 1, 1847, pl. 8, fig. 3.

Hab. Eastern and southern shores of San Francisco Bay, and Lower Sacramento Valley, in the counties Santa Clara, Alameda, Contra Costa, San Joaquin, Sacramento, etc.

1) Proc. U. S. Nat. Mus. Vol. 13, 1890, p. 337-345, pl. 27.

2) Journal. of. Morph. Vol. 3, p. 475-502.

2. **Chamæa fasciata rufula** Ridgway.

Chamæa fasciata rufula Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 109 (1903) (Nicasio, Marin Co., California).

Hab. Vicinity of San Francisco Bay, on west slope of Coast range, in Mendocino, Marin, San Francisco, San Mateo and Santa Clara counties, California.

3. **Chamæa fasciata phæa** Osgood.

Chamæa fasciata phæa Osgood, Proc. Biol. Soc. Wash. Vol. 13, p. 42 (1899) (Newport, Yaquina Bay, Oregon).

Hab. Coast district of Oregon (Yaquina Bay) and northern California from mouth of Columbia River to Humboldt Bay.

4. **Chamæa fasciata henshawi** Ridgway.

Chamæa fasciata henshawi Ridgway, Proc. U. S. Nat. Mus. Vol. 5, p. 13 (1882) (Walkers Basin, Kern Co., South California).

Hab. Interior valleys and foothills and southern coast district of California, from eastern slope of the Coast Range in Napa and Lake counties, northward to Shasta County, and southward through Sacramento and Joaquin valleys and western foothills of Sierra Nevada to Kern County, thence southwards through southern coast district to northwestern Lower California.

Munich, 15th October 1913.

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FAM. HYPOSITTIDÆ

FAM. HYPOSITTIDÆ

BY C. E. HELLMAYR

Hyposittidæ. Ridgway, Proc. Biol. Soc. Wash. Vol. 16, p. 125 (1903).

Characters. Bill half as long as head, rather strong, decidedly widened at base, where its width is about equal to its depth, and somewhat compressed terminally; culmen slightly ridged, its apical portion distinctly curved, uncinatè at tip; both maxillary and mandibular tomium with a slight, but distinct subterminal notch; gonys decidedly ascending terminally. Rictal bristles strongly developed, rather stiff, reaching over more than two-thirds of the whole bill. Nostrils basal, large, broadly oval, non-operculate, exposed, posteriorly concealed by the dense antrorse latero-frontal plumules as well as by some elongated, stiff bristles. Wing rather long, much rounded; fourth, fifth and sixth primaries nearly equal and longest; third about equal to seventh, both conspicuously shorter than the three longest primaries; second much shorter than third, about equal to ninth; first primary well-developed, though a little narrower than the following, somewhat longer than half the second; secondaries very broad, the outer ones decidedly longer than the innermost primaries; wing-tip much less than length of tarsus. Tail three-fourths as long as wing, very slightly rounded; rectrices of equal width with rounded tip. Tarsus about as long as middle toe without claw; acrotarsium booted; outer toe nearly as long as middle toe and united to the latter for the whole of its basal and half of its subbasal phalanges; inner toe only about half as long as outer toe and united to middle toe for the whole of its basal half; hallux fully as long as middle toe (without claw); claws much compressed, strongly arched with acute tip. Size small : Wing, 75-78; tail, 58-62 mm.

Coloration. Sexes different. The male is coloured as follows : Narrow frontal edge, lores and chin velvety black; crown, back, upper tail- and upper wing coverts bright greenish blue; cheeks and ear coverts rather paler and duller blue; remiges and rectrices dusky, exteriorly washed and edged with dull greenish blue. Under parts dull blue, slightly shaded

with greenish on sides and flanks; under wing coverts greyish with greenish blue tips; quill-lining distinctly rufescent-buff. The female differs by having the frontal edge, lores and chin whitish, the cheeks, ear coverts and all the lower parts dull smoky brownish, with some bluish shade here and there; the upper plumage, too, is of a more greenish blue. Bill coral-red, extreme tip dusky, feet blackish; iris dark red.

Geographical Distribution. Madagascar. Monotypic (one genus with a single species).

Habits and Nidification. In habits, it is said to resemble our Nuthatches, running up and down the trunks of trees in search of food. Its eggs seem to be unknown.

Observations. The single species constituting this family has been referred by various authors, as also formerly by myself, to the Nuthatches (*Sittidae*). It differs, however, so strikingly from all members of the latter group that there can be no question, I think, about its being much more properly placed in a separate family, as has been proposed by Mr. Ridgway. The differences between the two families may be summarized as follows 1).

- a. *Maxilla uncinata at tip, with tomium distinctly notched subterminally, the mandibular tomium also notched near tip; hallux (without claw) fully as long as middle toe (without claw); outer toe very nearly as long as middle toe and united to the latter for the whole of the basal and half of its subbasal phalanges; inner toe only about half as long as outer; tail three-fourths as long as wing.* HYPOSITTIDÆ.
- b. *Maxilla not uncinata at tip, mandibular tomium never, maxillary tomium sometimes (Neositta) very slightly notched subterminally; hallux (without claw) decidedly shorter than middle toe (without claw); outer toe decidedly shorter than middle toe and united to the latter for not more than the basal phalanx; inner toe three-fourths as long as outer toe; tail about half as long as wing* SITTIDÆ.

GENUS HYPOSITTA A. NEWTON

1863. **Hypherpes** (non Chaudoir 1838, *Coleoptera*!) A. Newton, Proc. Zool. Soc. Lond. 1863, p. 85 (Spec. Typ. : *H. corallirostris*, Newton).

1881. **Hypositta** A. Newton, ibidem, 1881, p. 438 (nom. emend. pro *Hypherpes*).

1. **Hypositta corallirostris** (A. Newton).

Hypherpes corallirostris A. Newton, Proc. Zool. Soc. Lond. 1863, p. 85, pl. 13 (1863) (Madagascar); descr. et fig. ♀.

Fig. Milne Edwards & Grandidier, Hist. Nat. Madagascar, Vol. 14, pl. 121-121 c.

Hab. Madagascar.

1) The principal characters have been so clearly pointed out by Mr. Ridgway that I cannot do better than reproduce (with some slight modifications) what he says about this subject in his great work (Bull. U. S. Nat. Mus. Wash. n° 50, Part 3, 1904, p. 439, footnote c).



FAM. HYPOSITTIDÆ

1. HYPOSITTA CORALLIROSTRIS ♀. 2. HEAD OF HYPOSITTA CORALLIROSTRIS ♂. 3. BILL OF HYPOSITTA CORALLIROSTRIS.
 4. LEG OF HYPOSITTA CORALLIROSTRIS. 5. 6. WING AND TAIL OF HYPOSITTA CORALLIROSTRIS ♀. 7. 8. HEAD AND
 BILL OF SITTA E. EUROPÆA. 9. LEG OF SITTA E. EUROPÆA.

EXPLANATION OF PLATE

- Fig. 1. *Hypositta corallirostris*, ♀.
— 2. Head of *H. corallirostris*, ♂.
— 3, 4. Bill and leg of *H. corallirostris*.
— 5, 6. Wing and tail of *H. corallirostris*.
— 7, 8, 9. Head, bill and leg of *Sitta europæa europæa*.

Munich, 15th November 1913.



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FAM. DROMAIIDÆ

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BY L. BRASIL



HE *Dromaiidæ* or Emus, containing only one Genus, *Dromaius*, constitute in the Subclass *Palaeognathæ* a Family near to the *Casuariidæ* but quite distinct; the two Families, *Dromaiidæ* and *Casuariidæ*, are often united in a same Order, *Casuarii*, *Casuariiformes*, or *Megistanes*.

Characters. Next to the Ostrich, Emus are the largest of existing birds, *Dromaius novæhollandiæ* standing more than 1 m. 50 high.

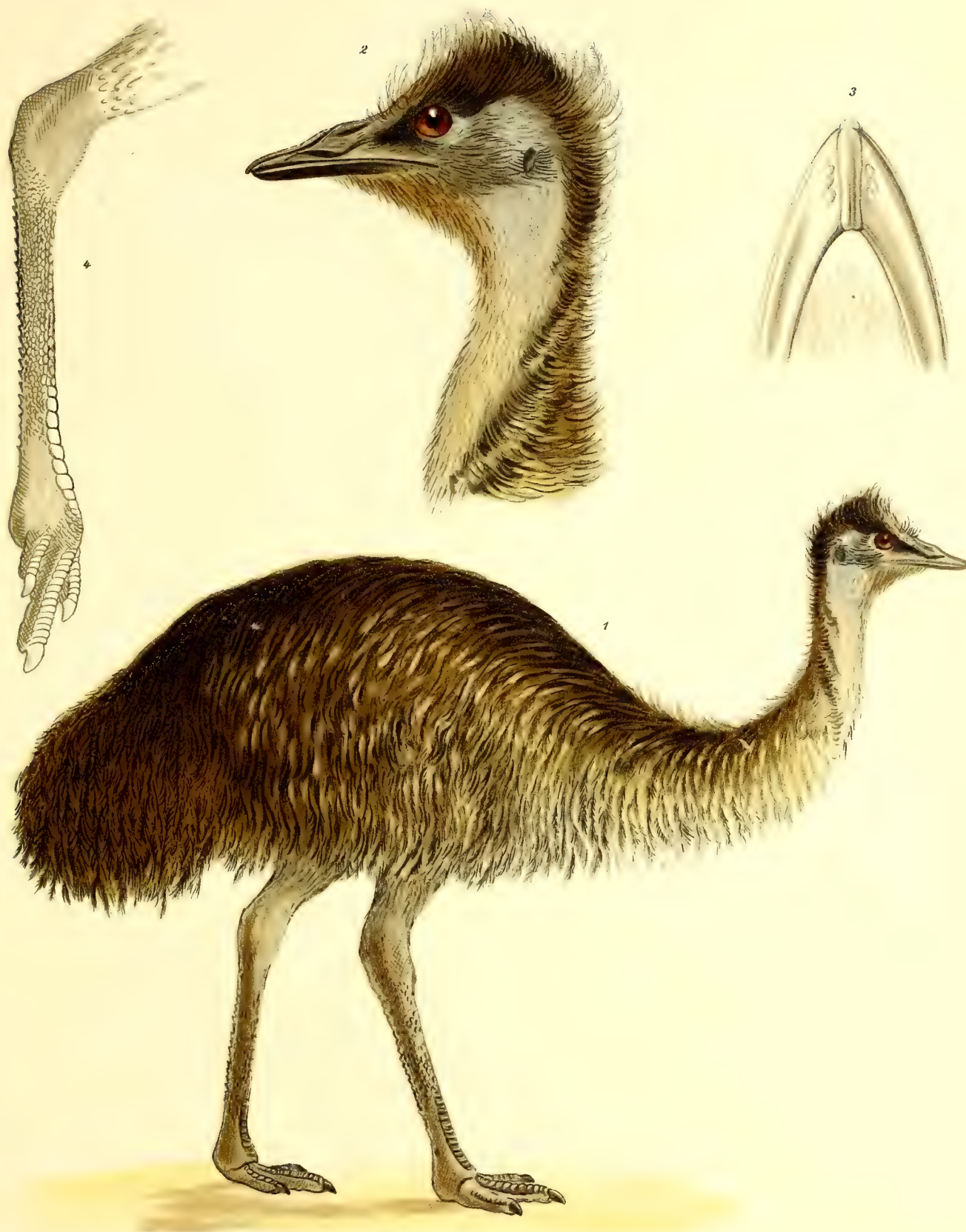
The head is relatively small, devoid of helmet; the crown is covered with semi-erect or recurved feathers; the sides of face are more or less bare and show hair-like bristles. The bill is moderate, broad, dorso-ventrally depressed; the culmen is elevated at the base. The nostrils, about the middle of the bill in position, are impervious and placed in a large membranous groove with the opening anteriorly; they are not protected by an opercle. The neck is long, bare on the sides of its upper part, feathered elsewhere, devoid of wattles. The wings are rudimentary, without real quills; the degenerate remiges, seventeen in number, possessing an aftershaft, are similar to the body feathers; an ala spuria is wanting. The rectrices are undistinguishable, so that the tail is not apparent. The tibiæ are wholly feathered. The metatarsi are long, more slender, and less powerful than in *Casuarinus*; they are covered posteriorly with a series of rough scales, in front with small reticulate plates, which gradually fuse to form ten large tranverse scutes placed on the distal third. Three front toes are present, the inner being the shortest. There is no hallux. The claws, about equally large, are short and strong. The planta is covered with small reticulate plates. Feathers have an aftershaft extremely large, equal to the main shaft, as in *Casuarinus*, but they are less desintegrated, so that the plumage is less hair-like, more softer. The general colouration is blackish, brown, or ashy-grey.

An uropygium is distinctly traceable in the nestling, much more easily demonstrable in the ripe embryo (Pycraft).

The small intestine is long and relatively narrow; the rectum is short, nearly straight; the cæca are of moderate length. The right lobe of the liver is larger than the left; a spigelian lobe is present; there is a well-developed gall bladder; the hepatic and pancreatic ducts open separately into the duodenum. The trachea is peculiar in that its front wall is pierced by a long, vertical, slit-like median aperture, caused by the deficiency of certain of the tracheal rings in this region; the lining membrane of the tube projects from this opening and forms a large dilatable sac, which can be filled with air at will; this remarkable structure is, no doubt, an organ of sound, which probably produces the peculiar drumming of the bird. There are two carotids. Accordingly to the degenerate condition of the fore limb, many muscles have disappeared: the pectoralis propatagialis, biceps propatagialis, deltoïdes propatagialis, deltoïdes minor, scapulo-humeralis anterior, serratus metapatagialis, latissimus dorsali metapatagialis, pectoralis abdominalis; traces of the expansor secundariorum are said to exist; the pectoralis major is very reduced; the latissimus dorsi anterior is present; the rhomboïdeus profundus and superficialis arise from ribs, the latter from three, the former from only one; the biceps arises from the whole of the coracoid and from just an adjacent bit of the sternum; the ambiens and the femorocaudal are wanting; all the gluteals are present; the accessory femorocaudal is very large; a strongly developed dermo-dorsalis is present. The vertebræ are fifty-four in number, of which seventeen or eighteen are cervical, nine or ten post-sacral; the atlas is notched, very nearly perforated; the sternum is entire and it is rather pointed at its extremity; rudimentary clavicles exist; the pre-coracoids are vestigial; the wing is so reduced that it is scarcely longer than the skull; there is no distinguishable carpal region; the metacarpals and phalanges have all fused into one indistinguishable rod of bone; the pubes and ischia are united posteriorly with the ilium, but only by cartilage; the pectineal process is well developed; the interobturator process is present, and shuts off an anterior portion of the obturator foramen; the femur is highly pneumatic, and bears a large pneumatic foramen between its head and the great trochanter; the vomer is expanded into a broad flattened plate between the maxillo-palatines, and it is separated from the parasphenoidal rostrum; the beak is dorso-ventrally depressed; the palatines are fenestrated posteriorly, and they are not anchylosed with pterygoids; the horizontal plate of the mesethmoid appears on the surface of the skull between nasals, but it is never inflated to form a casque; the lachrymals fuse with nasals and frontals; the supra-orbital processes are long.

The anatomical characters given above are borrowed for a large part from Beddard and from Pycraft.

Habits and Reproduction. Emus inhabit large plains or open forest districts. They are monogamous, but they unite in small companies after breeding. They run stongly and rapidly, and rest on the whole metatarsus. They love bathing, and can get through water very quickly, being capable of crossing even a broad river. Their food consists of all sorts of vegetable matters, fruits, roots, herbage, etc., but they seem to prefer fruits. They utter at times a hissing or grunting sound, and, in the breeding season, the peculiar drumming is produced by both sexes when the birds are near the nest; the male's voice is sharper and more distinct. The nest is « usually a flat bed or platform composed of grass or other herbage plucked by the bird round about the site, and trampled down; sometimes bark, pieces of sticks, and leaves



FAM. DROMAIDÆ

1. DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ. 2. HEAD OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ.
3. BILL OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ. 4. FOOT OF DROMAIUS NOVÆHOLLANDIÆ NOVÆHOLLANDIÆ.

of trees are used, intermingled with a few of the bird's own feathers» (Campbell); the shape is generally oval, about 1 m. 20 by 0 m. 75 in size, and about 5 cm. in thickness; sometimes no nest is formed. The eggs, which are small for the size of the bird, are elliptical in shape; the surface is rough, with granulations of dark green upon a shell of more or less light metallic green. The clutch varies from seven to eighteen eggs, but it is possible that when the number of eggs is larger than eleven or twelve, the nest was used by two females at least. The male performs a very large part of the duties of incubation, and, with the female, attends upon the chicks. The young bird in down shows broad longitudinal dark streaks on a light ground.

The Emu of Australia is the only one that still exists. Those that lived in the neighbouring islands have now all disappeared, and very little is known about them. One, in particular, the dwarf Emu of King Island, is only known by what the French traveller Péron, who observed it in the beginning of the nineteenth century, says of it, and also by a few bones coming from a recent sandy formation. With our actual knowledge, no special character distinguishes clearly this bird from the dwarf Emu of Kangaroo Island, *Dromaius peroni*, and if we may think that it belongs at least to a distinct race localised at King Island, the insufficiency of our documentation about it does not allow us to be absolutely positive. However, the King Island Emu is generally designated under the name of *Dromaius minor*, which name Spencer used in describing the bones mentioned above. It is also under the name of *Dromaius minor* that the King Island Emu figures below, but subject to the above remarks.

Range. Australia; formerly adjacent islands, Tasmania, Kangaroo Island, King Island.

Bibliography. Salvadori, Cat. Birds Brit. Mus. Vol. 27, pp. 585-589 (1895); Chalmers Mitchell, Proc. Zool. Soc. Lond. 1896, p. 140; Beddard, Structure and Classification of Birds, pp. 493-528 (1898); Sharpe, Hand-list Birds, Vol. 1, pp. 2-3 (1899); Milne-Edwards & Oustalet, Bull. Mus. Hist. Nat. Vol. 5, pp. 206-214 (1899); Pycraft, Trans. Zool. Soc. Lond. Vol. 15, pp. 149-290 (1900); Chalmers Mitchell, Trans. Linn. Soc. Lond. Vol. 8, p. 182 (1901); Mathews, Birds Australia, Vol. 1, pp. 1-27 (1910); Novit. Zool. Vol. 18, pp. 175-176 (1912); Austr. Avian Rec. Vol. 1, p. 107 (1912); Rothschild, Verhandl. V. Intern. Ornith. Kongr. pp. 151 & 160 (1912); Dubois, Bull. Soc. Zool. France, Vol. 37, pp. 308-310 (1913); Brasil, Bull. Soc. Linn. Norm. (6), Vol. 6, pp. 76-97 (1914).

The *Dromaiidæ* consist of a single Genus.

GENUS DROMAIUS VIEILLLOT

Dromaius Vieillot, Analyse, p. 70 (1816).

(Also spelt, *Dromiceius*, *Dromæus*, *Dromiceus*, *Dromeicus*.)

Synonyms: *Tachea* Fleming, Philos. of Zool. Vol. 2, p. 257 (1822).

? *Chelarga* Billberg, Syn. Faunæ Scand. Vol. 1, Pars 2, tab. A (1828).

Peronista Mathews, Austr. Avian Rec. Vol. 1, p. 107 (1912).

Type: *Dromaius novæhollandiæ novæhollandiæ* (Latham).

Characters. The same as those of the Family.

Geographical Distribution. The same as the range of the Family.

KEY TO THE SPECIES AND SUBSPECIES

- A. *Tarsus more than 30 cm. in length.*
- a. *Feathers of fore-neck black in contrast to the under surface . . .*
 - a'. *Feathers of the upper-surface not wholly blackish . . .*
 - a''. *Feathers of the upper-surface brown and tipped with black.* 1. D. NOVEHOLLANDIÆ NOVEHOLLANDIÆ.
 - b''. *Feathers of the upper-surface brown, not tipped with black.* 2. D. NOVEHOLLANDIÆ WOODWARDI.
 - b'. *Feathers of the upper-surface wholly blackish* 3. D. NOVEHOLLANDIÆ ROTHSCHILDI.
 - b. *Feathers of the fore-neck whitish like the remainder of the under-surface* 4. D. NOVEHOLLANDIÆ DIEMENENSIS.
- B. *Tarsus less than 30 cm. in length.*
- c. *Pelvic limb slenderer?* 5. D. PERONI.
 - d. *Pelvic limb stouter?* 6. D. MINOR.

1. **Dromaius novæhollandiæ novæhollandiæ** (Latham) (Plate, Fig. 1-4). E. Australia.
- Casuarus novæhollandiæ* Latham, Ind. Orn. Vol. 2, p. 665 (1790).
Dromicæus novæhollandiæ Vieillot, Anal. p. 54 (1816).
Dromaius ater Vieillot (pars), Nouv. Dict. Hist. Nat. Vol. 10, p. 212 (1817).
Dromaius irroratus Bartlett, Proc. Zool. Soc. Lond. 1850, p. 205.
Dromæus novæhollandiæ Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 586 (1895).
Dromæus irroratus Salvadori, ibidem, p. 589 (1895).
Dromæus novæhollandiæ Sharpe, Hand-list Birds, Vol. 1, p. 2 (1899).
Dromæus irroratus Sharpe, ibidem, p. 3 (1899).
Dromaius novæhollandiæ novæhollandiæ Mathews, Birds Austral. Vol. 1, p. 3, pl. 1 (1910).
Dromicæus novæhollandiæ novæhollandiæ Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromaius novæhollandiæ novæhollandiæ Rothschild, Verhandl. V. Ornith. Kongr. p. 151 (1912).
Dromicæus novæhollandiæ Dubois, Bull. Soc. Zool. France, Vol. 37, p. 309 (1913).
2. **Dromaius novæhollandiæ woodwardi** Mathews. N. W. Australia.
- Dromicæus novæhollandiæ woodwardi* Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromicæus novæhollandiæ var. *woodwardi* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 309 (1913).
3. **Dromaius novæhollandiæ rothschildi** Mathews. S. W. Australia.
- Dromicæus novæhollandiæ rothschildi* Mathews, Novit. Zool. Vol. 18, p. 175 (1912).
Dromicæus novæhollandiæ var. *rothschildi* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).
4. **Dromaius novæhollandiæ diemenensis** Le Souëf. Tasmania (Extinct).
- Dromæus diemenensis* Le Souëf, Cat. Austral. B. Eggs and Nests, p. 23 (1904).
Dromæus diemenensis Le Souëf, Bull. Brit. Orn. Club, Vol. 21, p. 13 (1907).
Dromaius novæhollandiæ diemenensis Mathews, Birds Austral. Vol. 1, p. 14, pl. 2 (1910).
Dromaius novæhollandiæ diemenensis Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Dromicæus novæhollandiæ var. *diemenensis* Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).
5. **Dromaius peroni** Rothschild. Kangaroo Isl. (Extinct).
- Casuarus novæhollandiæ* Peron, Voy. Découv. Terres Austral. Vol. 2, p. 19, pl. 36 (1816).
Dromaius ater Vieillot (pars), Nouv. Dict. Hist. Nat. Vol. 10, p. 212 (1817).
Dromaius ater Vieillot, Gal. des Ois. pl. 226 (1825).
Dromaius parvulus Gould, in Broderip's Penny Cyclop. Vol. 23, p. 145 (1842).
Dromaius ater Milne-Edwards & Oustalet, Vol. comm. Centen. Mus. Hist. Nat. Paris, p. 246, pl. 5 (1893).
Dromæus ater Salvadori, Cat. Birds Brit. Mus. Vol. 27, p. 588 (1896).

- Dromaeus ater* Sharpe, Hand-list Birds, Vol. 1, p. 3 (1899).
Dromaeus peroni Rothschild, Extinct Birds, p. 235, pl. 40 (1907).
Dromaeus parvulus Mathews, Birds Austral. Vol. 1, p. 19, pl. 3 (1910).
Dromaeus minor Mathews (pars), ibidem, p. 23, pl. 4 (1910).
Dromiceius spenceri Mathews, Novit. Zool. Vol. 18, p. 176, footnote (1912).
Dromaeus parvulus Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Peronistia peroni Mathews, Austr. Avian. Rec. Vol. 1, p. 107 (1912).
Dromiceius peroni Dubois, Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).
Dromiceius minor Dubois (pars), ibidem, p. 310 (1913).

6. *Dromaeus minor* Spencer.

King Isl. (Extinct).

- Dromaeus minor* Spencer, Vict. Nat. Vol. 23, p. 149 (1906).
Dromaeus bassi Legge, Emu 6, p. 119 (1907).
Dromaeus minor Rothschild, Extinct Birds, p. 237 (1907).
Dromaeus minor Mathews (pars), Birds Austral. Vol. 1, p. 23 (1910).
Dromaeus minor Rothschild, Verhandl. V. Intern. Ornith. Kongr. p. 151 (1912).
Dromiceius minor Dubois (pars), Bull. Soc. Zool. France, Vol. 37, p. 310 (1913).

EXPLANATION OF PLATE

Fig. 1. *Dromaeus novæhollandiæ novæhollandiæ*.

- | | | | | |
|------|---|---|---|-------------|
| — 2. | — | — | — | (the head). |
| — 3. | — | — | — | (the bill). |
| — 4. | — | — | — | (the foot). |

Caen, 19th January 1914.

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FAM. MESITIDÆ

FAM. MESITIDÆ

BY L. BRASIL



THE Family *Mesitidæ* consists of a single Genus *Mesites* Geoffroy Saint-Hilaire (= *Mesœnas* Reichenbach), which is confined to Madagascar. This Genus was originally referred by Isidore Geoffroy Saint-Hilaire (1838) to the neighbourhood of the Pigeons, then placed near the Mound-builders by Gray (1841), Reichenbach (1851), and Bonaparte (1854). Afterwards, at J. Verreaux's suggestion, it seems, the Genus has been classed by Gray (1869), Sundevall (1872), and Hartlaub (1877) in the Passerine birds. A. Milne-Edwards (1878), judging from his own dissection of *Mesites variegata*, the single known species, put the bird close to the Rails and Herons. Gadow (1893), considering *Mesites* as a link between the *Gruiformes*, the *Tinamiformes*, and the *Galliformes*, has referred it to this last Order. On the other side, Forbes (1882), after Bartlett (1877), has pointed out the affinities of *Mesites* with *Eurypyga* and *Rhinoceros*; Sharpe (1891, 1899), acknowledging the truth of this observation, has placed the three birds in the Order *Gruiformes* or *Grues*, where I put them also.

Characters. *Mesites variegata* is a bird of a moderate size, being large about as a Water Rail.

The bill is slender, compressed, moderate in length, shorter than the head, the culmen rounded and slightly incurved; the nostrils are long, linear and concave upturned slits, extending for more than half the length of the bill, and covered with a well-marked membranous valvular operculum. The wings are short and obtuse; the primaries are ten in number, the first of which is rather long, the next three are on increasing, the next three are equal; there are six secondaries. The tail is long, strong, and rounded; there are sixteen upper tail-coverts, fourteen rectrices, which are longer than the upper tail-coverts, and fourteen under tail-coverts about one quarter shorter. The legs are rather long, slender, weak; the tibiæ are

naked on their inferior part ; the metatarsi are scutellated ; the toes are slender ; the hallux is inserted on the same level than the front toes, the inner of which is shorter than the outer ; at the base, on a very small extent, the outer and middle toes are united by a skin expansion. The feathers have no aftershaft ; their rhachis is slender and weak, the barbs are without strong adherence, so that the plumage is very soft to the touch.

The pterylosis has been fully described by Forbes and summed up as it follows by Beddard : « There are four apteria on the neck, since both dorsal and ventral tracts divide early. The dorsal tracts converge inter-scapularly, and then become much feebler, and are continued on to the Y-shaped posterior part of the tract. The ventral tracts cease altogether at the commencement of the pectoral region, but recommence behind the powder-downs. The outer branch is present, but is quite inconnected with the main stem. » There are five pairs of powder-down patches : two pairs are dorsal, one in the interscapular region, the other on the rump ; two pairs are ventral, one on the breast, the other on the posterior ventral region ; the patches of the fifth pair are lateral, being axillary in situation. The oil gland is present and apparently nude.

The tongue is long, slender, bifid at its extremity. There are two carotids. The sternum is weak and narrow ; the keel is small and has its anterior angle about on the middle of the breast-bone ; anterior and posterior lateral processes are present and well-developed. The clavicles are wanting. According to the terrestrial habits and to the high run-power of the bird, the wing bones are reduced, but the pelvis is very wide and the legs are strong boned ; the skull is schizognathous with weak maxillo-palatines. In the hind limb musculature, the femorocaudal and its accessory, the semitendinosus and its accessory, the ambiens, are all present.

The female has a more uniformly coloured plumage than the male ; she is more rufous and originally she has been described as a distinct species, *Mesites unicolor*.

Habits and Reproduction. *Mesites* is a terrestrial bird inhabiting only some wooded eastern districts of the mountains of Madagascar. It does not fly, but runs quickly. When the bird is walking, it stops frequently looking on all sides, then runs again. The cry is a feeble deaf note, uttered specially in running. Insects, chiefly ants, constitute the main part of the feeding. The nest is upon the ground ; it is made of small branches, sprigs of rush, or *Pandanus* leaves.

Range. The *Mesitidæ* are confined to Madagascar.

Bibliography. Milne-Edwards et Grandidier, Hist. Nat. Madagascar, Ois. Vol. 2, p. 601 (1885) ; Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 244 (1894) ; Beddard, Structure and Classification of Birds, p. 379 (1898) ; Sharpe, Hand-list Birds, Vol. 1, p. 180 (1899).

The *Mesitidæ* consist of a single Genus *Mesites*. Only one Species is known, *M. variegata*.

GENUS MESITES GEOFFROY SAINT-HILAIRE

Mesites Geoffroy Saint-Hilaire, Comptes Rendus Acad. Sc. Paris, Vol. 6, p. 440 (1838).

Synonym : *Mesenas* Reichenbach, Naturgesch. Tauben, p. 6 (1862).

Mesitornis attributed by Gray (Hand-list, Vol. 1, p. 267, 1869) to Bonaparte has never been introduced by this ornithologist for replacing *Mesites* (see Comptes Rendus Acad. Sc. Paris, Vol. 41, pp. 650-651, 1855).



FAM. MESĒNATIDÆ

1. MESĒNAS VARIEGATA ♂. 2. HEAD OF MESĒNAS VARIEGATA. 3. MESĒNAS VARIEGATA ♀. 4. WING OF MESĒNAS VARIEGATA. 5. TAIL OF MESĒNAS VARIEGATA. 6. FOOT OF MESĒNAS VARIEGATA. 7. BILL OF MESĒNAS VARIEGATA.

Characters and Geographical Distribution. The same as those of the Family.

1. *Mesites variegata* Geoffroy Saint-Hilaire (**Plate, Fig. 1-7**). Madagascar.

Mesites variegata Geoffroy Saint-Hilaire, Comptes Rendus Acad. Sc. Paris, Vol. 6, p. 440 (1838).

Mesites unicolor Des Murs, Rev. Zool. Vol. 8, p. 176 (1845).

Mesænas variegata Reichenbach, Naturgesch. Tauben, p. 6 (1862).

Mesænas unicolor Reichenbach, Naturgesch. Tauben, p. 7 (1862).

Mesites variegata Sharpe, Cat. Birds Brit. Mus. Vol. 23, p. 244 (1894).

Mesænas variegata Sharpe, Hand-list Birds, Vol. 1, p. 180 (1899).

Mesites variegata Reichenow, Die Vögel, Vol. 1, p. 222 (1913).

EXPLANATION OF PLATE

Fig. 1. *Mesites variegata* ♂.

— 2.	—	—	(the head, natural size).
— 3.	—	—	♀.
— 4.	—	—	(the wing).
— 5.	—	—	(the tail).
— 6.	—	—	(the left foot).
— 7.	—	—	(the bill, from above).

(From Milne-Edwards & Grandidier's *Histoire Naturelle de Madagascar*).

(On the Plate, for *Mesænatidæ*, *Mesænas*, read *Mesitidæ*, *Mesites*).

Caen, 16th June 1914.

